CUK-H03018-1-P006751

ABACUS

A Journal of Accounting and Business Studies

Volume 24 **Number 1** **March 1988**

Towards a Theory of Cultural Influence on the Development of Accounting Systems Internationally
S. J. Gray

Legacy of the Golden Age: Recent Developments in the Methodology of Accounting
M. J. R. Gaffikin

Apportionment in Actions Against Auditors
D. R. Gwilliam

The Eighteenth-Century Origins of Cost Accounting
M. J. Mepham

Goodwill—An Example of Puzzle-Solving in Accounting
Ronald Ma and Roger Hopkins

Deprival Value or Value to the Owner?—a Clarification
Ian A. M. Fraser

The Contribution of Non-U.S. Institutions to Academic Accounting Journals
Robert C. Reeve and Patrick J. Hutchinson

1

SYDNEY UNIVERSITY PRESS

ABACUS

A Journal of Accounting and Business Studies

Style Guide to Contributors

1. Submit two copies of manuscript.
2. Use opaque quarto paper (207 mm × 260 mm) or A4 (210 mm × 297 mm); double space text; leave adequate (30 mm) margins on both sides.
3. Place name of author in BLOCK capitals above the title of the article. Give author's present position at the foot of the first page, as in this issue.
4. Use footnotes sparingly. Place them at the end of the manuscript, double spaced with an extra line between entries. Number footnotes consecutively throughout the text; use superior numbering without point, thus: '. . . money'.[3] Cite books and articles in the text thus: . . . (Jones, 1962, p. 21).

   For page reference numbers use p. 21, pp. 423-32, pp. 406-571, but pp. 11-13, pp. 115-19.
5. List books and articles cited in alphabetical order at the end of the manuscript. When listing books and articles use the following forms respectively:

   Jones, A., *Depreciation of Assets*, Publisher & Co., 1962.

   Morrisey, Leonard, 'Intangible Costs' in Morton Backer (ed.), *Modern Accounting Theory*, Prentice-Hall, 1966.

   Revsine, L. and J. Weygandt, 'Accounting for Inflation: The Controversy', *Journal of Accountancy*, October 1974.

   Smith, B., 'An Aspect of Depreciation', *The Journal of Accounting,* August 1965.

   Do not use brackets; use short titles for publishers unless it is essential to tracing.
6. Underline what is to be printed in italics. Use BLOCK capitals only for what is to be printed in capitals. Use italics and BLOCK capitals sparingly. Use the smallest number of styles for section headings; preferably side headings, in italics.
7. For quotations within the text use only single quotation marks, and double marks for quotes within quotes. Where quotations exceed four lines inset quoted material three spaces, but do not use quotation marks.
8. Do not use a point in standard abbreviations such as CPA, SEC, but use points in U.K., U.S.A., and similar abbreviations. Date style e.g. 19 February 1966.
9. Use double dashes (–) to indicate dashes in the text, single dashes (-) for hyphens.
10. Use 'z' for such words as capitalize; 's' for the smaller number of words such as advise, analyse, comprise, enterprise (see *Oxford English Dictionary*).
11. Use the simplest possible form for mathematical symbols.
12. Keep tables to a minimum, but do not try to convey too much information, at the cost of simplicity, in any one table.
13. For book reviews use the following form for headnotes:
    A. JONES. *Depreciation*, Publisher & Co., London 1966, vii + 212 pp.

657
Ab15

ABACUS

A Journal of Accounting and Business Studies
published by Sydney University Press

VOLUME 24 NUMBER 1 MARCH 1988

CONTENTS

Towards a Theory of Cultural Influence on the Development of Accounting Systems Internationally
S. J. Gray 1

Legacy of the Golden Age: Recent Developments in the Methodology of Accounting
M. J. R. Gaffikin 16

Apportionment in Actions Against Auditors
D. R. Gwilliam 37

The Eighteenth-Century Origins of Cost Accounting
M. J. Mepham 55

Goodwill—An Example of Puzzle-Solving in Accounting
Ronald Ma and Roger Hopkins 75

Deprival Value or Value to the Owner?—a Clarification
Ian A. M. Fraser 86

The Contribution of Non-U.S. Institutions to Academic Accounting Journals
Robert C. Reeve and Patrick J. Hutchinson 90

EDITOR: M. C. Wells, University of Sydney

ASSISTANT EDITOR: G. W. Dean, University of Sydney

EDITORIAL BOARD

A. D. Barton, Australian National University
R. J. Chambers (Editorial Consultant), University of Sydney
F. L. Clarke, University of Newcastle
R. G. May, University of Texas at Austin
K. Someya, Waseda University
A. L. Thomas, University of Kansas
R. G. Walker, University of New South Wales
G. Whittington, University of Bristol
G. P. Whittred, University of Sydney

EDITORIAL PANEL

P. Brown, University of Western Australia
D. M. Emanuel, University of Auckland
G. A. Feltham, University of British Columbia
W. L. Ferrara, Pennsylvania State University
S. J. Gray, University of Glasgow
P. Griffin, University of California at Davis
G. A. Lee, University of Nottingham
R. Ma, University of the South Pacific
P. E. M. Standish, University of Tasmania
D. P. Tweedie, Thomson McLintock & Co., Edinburgh

ABACUS has as its objective the publication of exploratory constructive and critical articles on all aspects of accounting and on those phases of the theory and administration of organizations and of economic behaviour generally which are related to accounting and finance.

Manuscripts should be sent to the Editor and will be considered for publication only if accompanied by a submission fee of $20.00. The submission fee is waived if the author or a co-author is a personal subscriber to the journal. The general layout and style should follow the most recent Style Guide which is printed in the journal from time to time.

Editorial correspondence should be adressed to The Editor, ABACUS, c/- Department of Accounting, University of Sydney, N.S.W. Australia 2006. Business correspondence should be sent to Sydney University Press.

P. 6751

Two parts (March and September), making one volume, will be published each year, and the annual subscription for 1988 (surface mail) is: individuals $20.00; institutions, libraries and firms $37.50. Single copies are available at half the annual rate. Some back issues are still available—prices on application. Subscriptions should be sent to the publishers.

SYDNEY UNIVERSITY PRESS, Press Building, University of Sydney, N.S.W., Australia 2006.

Copyright is reserved and requests for permission to use, reproduce or photocopy any part of any material appearing in ABACUS must be made in writing to the Publisher. Microform and photo copies may be obtained from University Microfilms International (*U.K.* — 18 Bedford Row, London WC1R 4EJ. *U.S.A.* — 300 North Zeeb Road, Ann Arbor, Michigan 48106). Also where necessary permission is granted for libraries and others registered with the Copyright Clearance Center (CCC) to photocopy any article herein for the flat fee of US$2.50 per copy of the article plus 15 cents per page. Payments should be sent directly to the CCC, 21 Congress Street, Salem, MA 01970, U.S.A. 0001-3072.

Copyright © Sydney University Press

Printed in New Zealand by Wright & Carman Limited

ABACUS, Vol. 24, No. 1, 1988

S. J. GRAY

Towards a Theory of Cultural Influence on the Development of Accounting Systems Internationally

Research has shown that accounting follows different patterns in different parts of the world. There have been claims that national systems are determined by environmental factors. In this context, cultural factors have not been fully considered. This paper proposes four hypotheses on the relationship between identified cultural characteristics and the development of accounting systems, the regulation of the accounting profession and attitudes towards financial management and disclosure. The hypotheses are not operationalized, and empirical tests have not been carried out. They are proposed here as a first step in the development of a theory of cultural influence on the development of accounting systems.

Key words: Accounting policies; Culture; Financial reporting.

This paper explores the extent to which international differences in accounting, with specific reference to corporate financial reporting systems, may be explained and predicted by differences in cultural factors.

While prior research has shown that there are different patterns of accounting internationally and that the development of national systems tends to be a function of environmental factors, it is a matter of some controversy as to the identification of the patterns and influential factors involved (Mueller, 1967; Zeff, 1971; Radebaugh, 1975; Nair and Frank, 1980; Nobes, 1983). In this context the significance of culture does not appear to have been fully appreciated and thus the purpose of this paper is to propose a framework which links culture with the development of accounting systems internationally.

The first section of the paper reviews prior research on international classification and the influence of environmental factors. The second section addresses the significance of the cultural dimension and its application to accounting. The third section proposes a framework and develops hypotheses linking culture with the development of accounting attitudes and systems internationally, based on the cross-cultural work of Hofstede (1980, 1983). In the fourth section some culture area classifications are proposed. They have been developed on a judgmental basis, in the context of combinations of accounting attitudes or 'values' which determine (a) the authority for and enforcement of accounting systems, and (b) the measurement and disclosure characteristics of accounting systems.

S. J. GRAY is a Professor of Accounting, University of Glasgow, Scotland.

INTERNATIONAL CLASSIFICATION AND ENVIRONMENTAL FACTORS

Comparative accounting research has provided an enhanced awareness of the influence of environmental factors on accounting development (e.g., Mueller, 1967; Zeff, 1971; Radebaugh, 1975; Choi and Mueller, 1984; Nobes, 1984; Arpan and Radebaugh, 1985; Nobes and Parker, 1985). This research has contributed to a growing realization that fundamentally different accounting patterns exist as a result of environmental differences and that international classification differences may have significant implications for international harmonization and the promotion of economic integration. In this regard it has also been suggested that the identification of patterns may be useful in permitting a better understanding of the potential for change, given any change in environmental factors; and that policy-makers may be in a better position to predict problems that a country may be likely to face and identify solutions that may be feasible, given the experience of countries with similar development patterns (e.g., Nobes, 1984).

Research efforts in this area have tended to approach the international classification of accounting systems from two major directions. First, there is the deductive approach whereby relevant environmental factors are identified and, by linking these to national accounting practices, international classifications or development patterns are proposed (e.g., Mueller, 1967, 1968; Nobes, 1983, 1984). Second, there is the inductive approach whereby accounting practices are analysed, development patterns identified, and explanations proposed with reference to a variety of economic, social, political, and cultural factors (e.g. Frank, 1979; Nair and Frank 1980).

As regards the deductive approach to accounting classification, the environmental analysis by Mueller (1967) provides a useful starting point. Mueller identified four distinct approaches to accounting development in western nations with market-orientated economic systems. These were:

1. the macroeconomic pattern—where business accounting interrelates closely with national economic policies;
2. the microeconomic pattern—where accounting is viewed as a branch of business economics;
3. the independent discipline approach—where accounting is viewed as a service function and derived from business practice; and
4. the uniform accounting approach—where accounting is viewed as an efficient means of administration and control.

While all of these approaches were perceived to be closely linked to economic or business factors, a wider set of influences, for example, legal system, political system, social climate were recognized as being relevant, though without precise specification, to accounting development (Mueller, 1968; Choi and Mueller, 1984). Cultural factors received no explicit recognition, however, and were presumably subsumed in the set of environmental factors identified.

Mueller's analysis was adapted and extended by Nobes (1983, 1984) who based his classification on an evolutionary approach to the identification of measurement practices in developed Western nations. Nobes adopted a hierarchical scheme of classification in an endeavour to provide more subtlety and discrimination to the assessment of country differences. However, similarly to Mueller, no explicit mention was made of cultural factors. A basic distinction between microeconomic and macroeconomic systems was made together with a disaggregation between business economics and business practice orientations under a micro-based classification, and between Government/tax/legal and Government/economics orientations under a macro-uniform based classification. Further disaggregations were then made between U.K. and U.S. influences under the business practices orientation and between tax-based and law-based systems under the Government/tax/legal orientation. This classification system was then tested by means of a judgmental analysis of national financial reporting systems in fourteen countries.

A structural approach to the identification of accounting practices was adopted whereby major features were assessed, such as, the importance of tax rules, the use of prudent/conservative valuation procedures, the strictness of application of historical cost, the making of replacement cost adjustments, the use of consolidation techniques, the generous use of provisions, and the uniformity between companies in the application of rules. The results of the statistical analysis did not, however, go much beyond providing support for the classification of countries as either micro-based or macro-based. Thus the disaggregated elements of the classification scheme, though plausible, remain hypothetical accounting patterns subject to further empirical analysis.

By way of contrast, the inductive approach to identifying accounting patterns begins with an analysis of accounting practices. Perhaps the most important contribution of this type was by Nair and Frank (1980), who carried out a statistical analysis of accounting practices in fourty-four countries. An empirical distinction was made between measurement and disclosure practices as these were seen to have different patterns of development.

The empirical results, using factor analysis applied to individual practices, showed that in respect of the Price Waterhouse (1975) data it was possible to identify five groupings of countries, with Chile as a single-country 'group', in terms of measurement practices. The number of groupings increased to seven when disclosure practices were considered. The measurement groupings were characterized broadly, following the 'spheres-of-influence' classification suggested by Seidler (1967), as the British Commonwealth, Latin America/South European, Northern and Central European, and United States models. The disclosure groupings, on the other hand, could not be described plausibly on a similar 'spheres-of-influence' classification on account of their apparent diversity.

Subsequent to the identification of groupings, Nair and Frank attempted to assess the relationships of these groupings with a number of explanatory variables. While relationships were established in respect of some of the variables which included language (as a proxy for culture), various aspects of economic structure and trading ties, it was clear that there were differences as between the measurement and disclosure groupings. However, the hypotheses that (a) cultural and economic variables might be more closely associated with disclosure practices, and (b) trading variables might be more closely associated with measurement practices were not supported. It is curious to note here that the language variable, as a proxy for culture, was perceived to be a means of capturing similarities in legal systems which were thought to be particularly important in the determination of disclosure patterns. This is questionable in itself, but in any event no justification was given for the use of language as a proxy for culture.

From this brief review of some of the major studies in international classification it seems clear that to date only very broad country groupings or accounting patterns have been identified. At the same time, only very general relationships between environmental factors and accounting patterns have been established.

The significance of culture in the context of prior classification research is far from clear. It may be that cultural influences have been generally subsumed in the predominant concern with economic factors but this has not been made explicit. Accordingly, the influence of culture on accounting would seem to have been largely neglected in the development of ideas about international classifications.

THE CULTURAL DIMENSION

The significance of culture in influencing and explaining behaviour in social systems has been recognized and explored in a wide range of literatures but especially the anthropology, sociology and psychology literatures, (e.g., Parsons and Shils, 1951; Kluckhohn and Strodtbeck, 1961; Inkeles and Levinson, 1969; Douglas, 1977; Hofstede, 1980).

Culture has been defined as 'the collective programming of the mind which distinguishes the members of one human group from another' (Hofstede, 1980, p. 25). The word 'culture' is reserved for societies as a whole, or nations, whereas 'subculture' is used for the level of an organization, profession or family. While the degree of cultural integration varies between societies, most subcultures within a society share common characteristics with other subcultures (Hofstede, 1980, p. 26).

An essential feature of social systems is perceived to be the inclusion of a system of societal norms, consisting of the value systems shared by major groups within a nation. Values have been defined as 'a broad tendency to prefer certain states of affairs over others' (Hofstede, 1980, p. 19). Values at the collective level, as opposed to the individual level, represent culture; thus culture describes a system of societal or collectively held values.

In the accounting literature, however, the importance of culture and its historical roots is only just beginning to be recognized. While there has been a lack of attention to this dimension in the international classification literature, Harrison and McKinnon (1986) and McKinnon (1986) have recently proposed a methodological framework incorporating culture for analysing changes in corporate financial reporting regulation at the nation specific level. The use of this framework to assess the impact of culture on the form and functioning of accounting is demonstrated with reference to the system in Japan. Culture is considered an essential element in the framework for understanding how social systems change because 'culture influences: (1) the norms and values of such systems; and (2) the behaviour of groups in their interactions within and across systems' (Harrison and McKinnon, 1986, p. 239).

Complementing Harrison and McKinnon's approach is the suggestion here that a methodological framework incorporating culture may be used to explain and predict international differences in accounting systems and patterns of accounting development internationally. More specifically, it is proposed here to explore the extent to which cultural differences identified by Hofstede's cross-cultural research (1980, 1983) may explain international differences in accounting systems.

√CULTURE, SOCIETAL VALUES AND THE ACCOUNTING SUBCULTURE

Hofstede's (1980, 1983) research was aimed at detecting the structural elements of culture and particularly those which most strongly affect known behaviour in work situations in organizations and institutions. In what is probably one of the most extensive cross-cultural surveys ever conducted, psychologists collected data about 'values' from the employees of a multinational corporation located in more than fifty countries. Subsequent statistical analysis and reasoning revealed four underlying societal value dimensions along which countries could be positioned. These dimensions, with substantial support from prior work in the field, were labelled Individualism, Power Distance, Uncertainty Avoidance, and Masculinity. Such dimensions, which are examined further below, were perceived to represent elements of a common structure in cultural systems. It was also shown how countries could be grouped into culture areas, on the basis of their scores on the four value dimensions, using cluster analysis and taking into account geographical and historical factors. Figure 1 shows the culture areas identified and within each group any identifiable sub-groups.

The point of reviewing Hofstede's research here is that if societal value orientations are related to the development of accounting systems at the subcultural level, given that such values permeate a nation's social system, then it may be hypothesized that there should be a close match between culture areas and patterns of accounting systems internationally.

In order to explore further the relationship between culture and accounting systems in an international context it is necessary to identify the mechanism by which values at the societal level are linked to values at the accounting subcultural level as it is these latter values which are likely to influence directly the development of accounting systems in practice.

A model of this process is proposed in Figure 2. This is an adaptation and extension of the model relating to the formation and stabilizing of societal culture patterns proposed by Hofstede (1980, p. 27). In this model, societal values are determined by ecological influences modified by external factors such as international trade and investment, conquest, and the forces of nature. In turn, societal values have institutional consequences in the form of the legal system, political system, nature of capital markets, pattern of corporate ownership and so on. These institutions reinforce both ecological influences and societal values.

An extension of this model is proposed here whereby societal values are expressed at the level of the accounting subculture. Accordingly, the value systems or attitudes of accountants may be expected to be related to and derived from societal values with special reference to work-related values. Accounting 'values' will, in turn, impact on accounting systems.

FIGURE 1
CULTURE AREAS (HOFSTEDE)

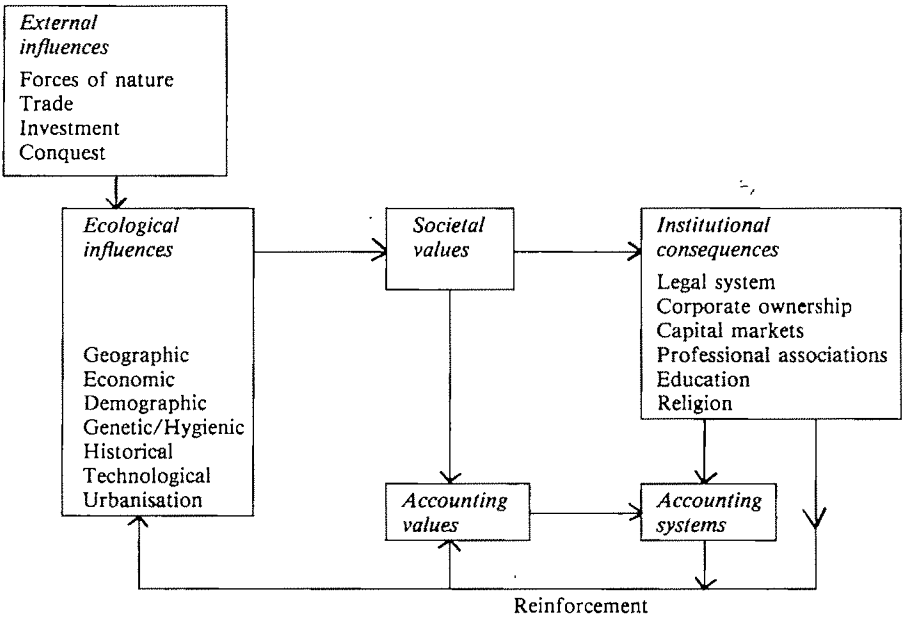
More developed Latin Belgium France —— Argentina Brazil Spain —— Italy	*Less developed Latin* Colombia Ecuador Mexico Venezuela —— Costa Rica Chile Guatemala Panama Peru Portugal Salvador Uruguay	*More developed Asian* Japan *African* East Africa West Africa
Less Developed Asian Indonesia Pakistan Taiwan Thailand —— India Malaysia Philippines	*Near Eastern* Arab countries Greece Iran Turkey Yugoslavia	*Asian-Colonial* Hong Kong Singapore
Germanic Austria Israel —— Germany Switzerland	*Anglo* Australia Canada Ireland New Zealand U.K. U.S.A. —— South Africa	*Nordic* Denmark Finland Netherlands Norway Sweden

If Hofstede has correctly identified Individualism, Power Distance, Uncertainty Avoidance, and Masculinity as significant cultural value dimensions then it should be possible to establish their relationship to accounting values. If such a relationship exists then a link between societal values and accounting systems can be established and the influence of culture assessed.

Before an attempt can be made to identify significant accounting values which may be related to societal values it is important to understand the meaning of the four value dimensions identified by Hofstede (1980, 1983) and referred to earlier. These dimensions are well expressed in Hofstede (1984, pp. 83-4) as follows:

> *Individualism versus Collectivism*
> Individualism stands for a preference for a loosely knit social framework in society wherein individuals are supposed to take care of themselves and their immediate families only. Its opposite, Collectivism, stands for a preference for a tightly knit social framework in which individuals can expect their relatives, clan, or other in-group to look after them in exchange for unquestioning loyalty (it will be clear that the word 'collectivism' is not used here to describe any particular political system). The fundamental

FIGURE 2
CULTURE, SOCIETAL VALUES AND THE ACCOUNTING SUB-CULTURE



issue addressed by this dimension is the degree of interdependence a society maintains among individuals. It relates to people's self-concept: 'I' or 'we'.

Large versus Small Power Distance
Power Distance is the extent to which the members of a society accept that power in institutions and organisations is distributed unequally. This affects the behaviour of the less powerful as well as of the more powerful members of society. People in Large Power Distance societies accept a hierarchical order in which everybody has a place which needs no further justification. People in Small Power Distance societies strive for power equalisation and demand justification for power inequalities. The fundamental issue addressed by this dimension is how a society handles inequalities among people when they occur. This has obvious consequence for the way people build their institutions and organisations.

Strong versus Weak Uncertainty Avoidance
Uncertainty Avoidance is the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. This feeling leads them to beliefs promising certainty and to maintaining institutions protecting conformity. Strong Uncertainty Avoidance societies maintain rigid codes of belief and behaviour and are intolerant towards deviant persons and ideas. Weak Uncertainty Avoidance societies maintain a more relaxed atmosphere in which practice counts more than principles and deviance is more easily tolerated. The fundamental issue addressed by this dimension is how a society reacts on the fact that time only runs one way and that the future is unknown: whether it tries to control the future or to let it happen. Like Power Distance, Uncertainty Avoidance has consequences for the way people build their institutions and organizations.

Masculinity versus Femininity
Masculinity stands for a preference in society for achievement, heroism, assertiveness, and material success. Its opposite, Femininity, stands for a preference for relationships, modesty, caring for the weak, and the quality of life. The fundamental issue addressed by this dimension is the way in which a society allocates social (as opposed to biological) roles to the sexes.

Having identified societal values is it possible then to identify significantly related accounting values at the level of the accounting subculture?

The following 'accounting' values, derived from a review of accounting literature and practice, are offered for consideration:

Professionalism versus Statutory Control—a preference for the exercise of individual professional judgment and the maintenance of professional self-regulation as opposed to compliance with prescriptive legal requirements and statutory control.

Uniformity versus Flexibility—a preference for the enforcement of uniform accounting practices between companies and for the consistent use of such practices over time as opposed to flexibility in accordance with the perceived circumstances of individual companies.

Conservatism versus Optimism—a preference for a cautious approach to measurement so as to cope with the uncertainty of future events as opposed to a more optimistic, laissez-faire, risk-taking approach.

Secrecy versus Transparency—a preference for confidentiality and the restriction of disclosure of information about the business only to those who are closely involved with its management and financing as opposed to a more transparent, open and publicly accountable approach.

It should be emphasized that there is no suggestion that these 'values' are necessarily the only values involved. What they do represent, however, is an attempt to identify value dimensions which appear to be widely recognized.

What arguments are there to support these accounting value dimensions? How do they relate to societal values? How are they likely to impact on the development of national accounting systems?

Professionalism versus Statutory Control

This is proposed as a significant accounting value dimension because accountants are perceived to adopt independent attitudes and to exercise their individual professional judgments to a greater or lesser extent everywhere in the world.

A major controversy in many Western countries, for example, surrounds the issue of the extent to which the accounting profession should be subject to public regulation/statutory control or be permitted to retain control over accounting standards as a matter for private self-regulation (e.g., Taylor and Turley, 1986).

The development of professional associations has a long history but they are much more firmly established in countries such as the U.S.A. and the U.K. than in some of the Continental European countries and in many of the less developed countries (e.g., Holzer, 1984; Nobes and Parker, 1985).

In the U.K., for example, the concept of presenting 'a true and fair view' of a company's financial position and results depends heavily on the judgment of the accountant as an independent professional. This is so to the extent that accounting information disclosures additional to, and sometimes contrary to, what is specifically required by law may be necessary. This may be contrasted with the traditional position in France and Germany where the professional accountant's role has been concerned primarily with the implementation of relatively prescriptive and detailed legal requirements (e.g., Gray and Coenenberg, 1984). With the implementation of the EEC directives this situation is now changing to the extent that there is some movement, if not convergence, along the professionalism spectrum.

To what extent then can professionalism be linked to the societal values of Individualism, Power Distance, Uncertainty Avoidance, and Masculinity? It is argued here that professionalism can be linked most closely with the individualism and uncertainty-avoidance dimensions. A preference for independent professional judgment is consistent with a preference for a loosely knit social framework where there is more emphasis on independence, a belief in individual decisions and respect for individual endeavour. This is also consistent with weak uncertainty avoidance where practice is all important, where there is a belief in fair play and as few rules as possible, and where a variety of professional judgments will tend to be more easily tolerated. There would also seem to be a link, if less strong, between professionalism and power distance in that professionalism is more likely to be accepted in a small power-distance society where there is more concern for equal rights, where people at various power levels feel less threatened and more prepared to trust people, and where there is a belief in the need to justify the imposition of laws and codes. As regards masculinity, however, there does not appear to be any significant link with professionalism.

Following from this analysis it may be hypothesized that:

H1: The higher a country ranks in terms of individualism and the lower it ranks in terms of uncertainty avoidance and power distance then the more likely it is to rank highly in terms of professionalism.

Uniformity versus Flexibility

This would seem to be a significant accounting value dimension because attitudes about uniformity, consistency or comparability are incorporated as a fundamental feature of accounting principles world-wide (e.g., Choi and Mueller, 1984; Arpan and Radebaugh, 1985; Nobes and Parker, 1985).

This is a value which is open to different interpretations ranging from a relatively strict inter-company and inter-temporal uniformity, to consistency within companies over time and some concern for comparability between companies, to relative flexibility of accounting practices to suit the circumstances of individual companies.

In countries such as France, for example, a uniform accounting plan has long been in operation, together with the imposition of tax rules for measurement purposes, where there is a concern to facilitate national planning and the pursuit of macroeconomic goals. In contrast, in the U.K. and U.S.A. there is more concern with inter-temporal consistency together with some degree of inter-company comparability subject to a perceived need for flexibility (e.g., Choi and Mueller, 1984; Holzer, 1984; Arpan and Radebaugh, 1985).

To what extent then can uniformity be linked to societal value dimensions? It is argued here that uniformity can be linked most closely with the uncertainty-avoidance and individualism dimensions. A preference for uniformity is consistent with a preference for strong uncertainty avoidance leading to a concern for law and order and rigid codes of behaviour, a need for written rules and regulations, a respect for conformity and the search for ultimate, absolute truths and values. This value dimension is also consistent with a preference for collectivism, as opposed to individualism, with its tightly knit social framework, a belief in organization and order, and respect for group norms. There would also seem to be a link, if less strong, between uniformity and power distance in that uniformity is more easily facilitated in a large power-distance society in that the imposition of laws and codes of a uniform character are more likely to be accepted. As regards masculinity, however, there does not appear to be any significant link with uniformity. Following from this analysis it may be hypothesized that:

> H2: The higher a country ranks in terms of uncertainty avoidance and power distance and the lower it ranks in terms of individualism then the more likely it is to rank highly in terms of uniformity.

Conservatism versus Optimism

This would seem to be a significant accounting value dimension because it is arguably 'the most ancient and probably the most pervasive principle of accounting valuation' (Sterling, 1967, p. 110).

Conservatism or prudence in asset measurement and the reporting of profits is perceived as a fundamental attitude of accountants the world over. Moreover, conservatism varies according to country, ranging from a strongly conservative approach in the Continental European countries, such as France and Germany, to the much less conservative attitudes of accountants in the U.S.A. and U.K. (e.g., Beeny, 1975, 1976; Nobes, 1984; Choi and Mueller, 1984; Arpan and Radebaugh, 1985).

The differential impact of conservatism on accounting measurement practices internationally has also been demonstrated empirically (e.g., Gray, 1980; Choi and Mueller, 1984). Such differences would seem to be reinforced by the relative development of capital markets, the differing pressures of user interests, and the influence of tax laws on accountants in the countries concerned.

To what extent then can conservatism be linked to societal value dimensions? It is argued here that conservatism can be linked most closely with the uncertainty avoidance dimension. A preference for more conservative measures of profits is consistent with strong uncertainty avoidance following from a concern with security and a perceived need to adopt a cautious approach to cope with the uncertainty of future events. There would also seem to be a link, if less strong, between high levels of individualism and masculinity on the one hand, and weak uncertainty avoidance on the other, to the extent that an emphasis on individual achievement and performance is likely to foster a less conservative approach to measurement. As regards the power distance dimension there does not, however, appear to be any significant link with conservatism.

Following from this analysis it may be hypothesized that:

> H3: The higher a country ranks in terms of uncertainty avoidance and the lower it ranks in terms of individualism and masculinity then the more likely it is to rank highly in terms of conservatism.

Secrecy versus Transparency

This would seem to be a significant accounting value dimension which stems as much from management as it does from the accountant owing to the influence of management on the quantity of information disclosed to outsiders (e.g., Jaggi, 1975). Secrecy, or confidentiality, in business relationships is, nevertheless, a fundamental accounting attitude (Arpan and Radebaugh, 1985).

Secrecy would also seem to be closely related to conservatism in that both values imply a cautious approach to corporate financial reporting in general; but with secrecy relating to the disclosure dimension and conservatism relating to the measurement dimension. The extent of secrecy would seem to vary across countries with lower levels of disclosure, including instances of secret reserves, evident in the Continental European countries, for example, compared to the U.S.A. and U.K. (e.g., Barrett, 1976; Choi and Mueller, 1984; Arpan and Radebaugh, 1985). These differences would also seem to be reinforced by the differential development of capital markets and the nature of share ownership which may provide incentives for the voluntary disclosure of information (e.g., Watts, 1977).

To what extent, then, can secrecy be linked to societal value dimensions? It is argued here that secrecy can be linked most closely with the uncertainty-avoidance, power-distance and individualism dimensions. A preference for secrecy is consistent with strong uncertainty avoidance following from a need to restrict information disclosures so as to avoid conflict and competition and to preserve security. A close relationship with power distance also seems likely in that high power-distance societies are likely to be characterized by the restriction of information to preserve power inequalities. Secrecy is also consistent with a preference for collectivism, as opposed to individualism, with its concern for those closely involved with the firm rather than external parties. A significant but less important link with masculinity also seems likely to the extent that more caring societies where more emphasis is given to the quality of life, people and the environment, will tend to be more open especially as regards socially related information.

Following from this analysis it may be hypothesized that:

H4: The higher a country ranks in terms of uncertainty avoidance and power distance and the lower it ranks in terms of individualism and masculinity then the more likely it is to rank highly in terms of secrecy.

ACCOUNTING VALUES AND CULTURE AREA CLASSIFICATIONS

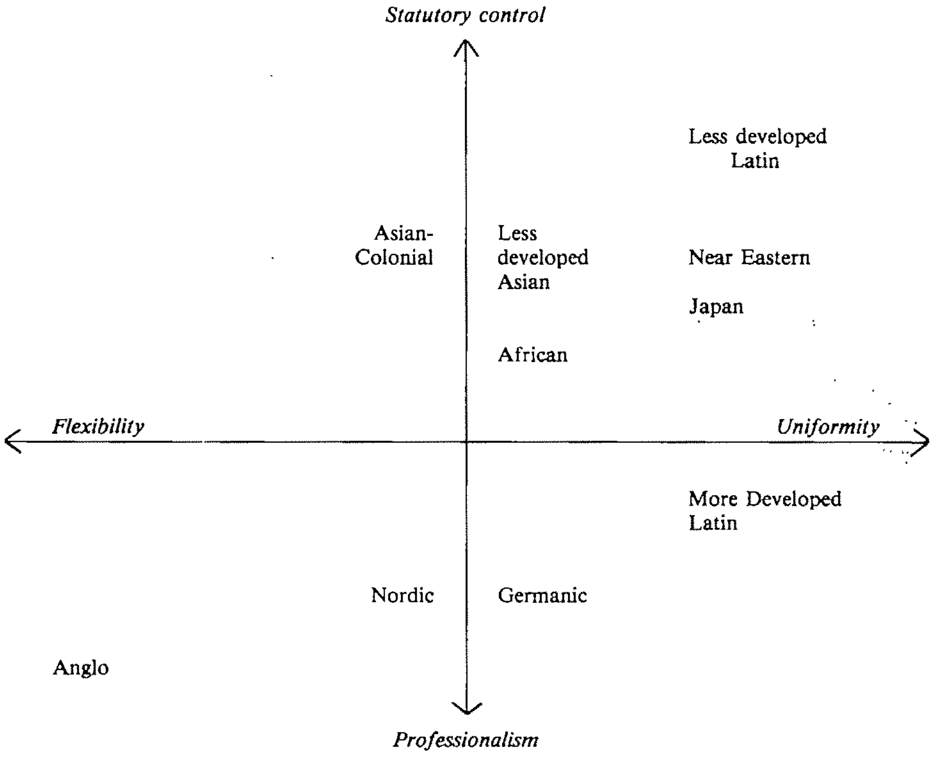
Having formulated hypotheses relating societal values to accounting values internationally, it is evident that the most important societal values at the level of the accounting subculture would seem to be uncertainty avoidance and individualism. While power distance and masculinity are also significant to some extent, masculinity appears to be of somewhat lesser importance in the system of accounting values.

It is now proposed to hypothesize culture area classifications in the context of combinations of accounting values. For this purpose it is argued here that a useful distinction can be made between the authority for accounting systems, that is, the extent to which they are determined and enforced by statutory control or professional means on the one hand, and the measurement and disclosure characteristics of accounting systems on the other.

Accounting values most relevant to the professional or statutory authority for accounting systems and their enforcement would seem to be the professionalism and uniformity dimensions in that they are concerned with regulation and the extent of enforcement or conformity. Accordingly, these can be combined and the classification of culture areas hypothesized on a judgmental basis as shown in Figure 3. In making these judgments reference has been made to the relevant correlations between value dimensions and the resultant clusters of countries identified from the statistical analysis carried out by Hofstede (1980, pp. 223, 316). From this classification it seems clear that the Anglo and Nordic culture areas may be contrasted with the Germanic and more developed Latin culture areas on the one hand, and the Japanese, Near Eastern, less developed Latin, less developed Asian and African culture areas on the other. The Colonial Asian countries are separately classified, representing a mixture of influences.

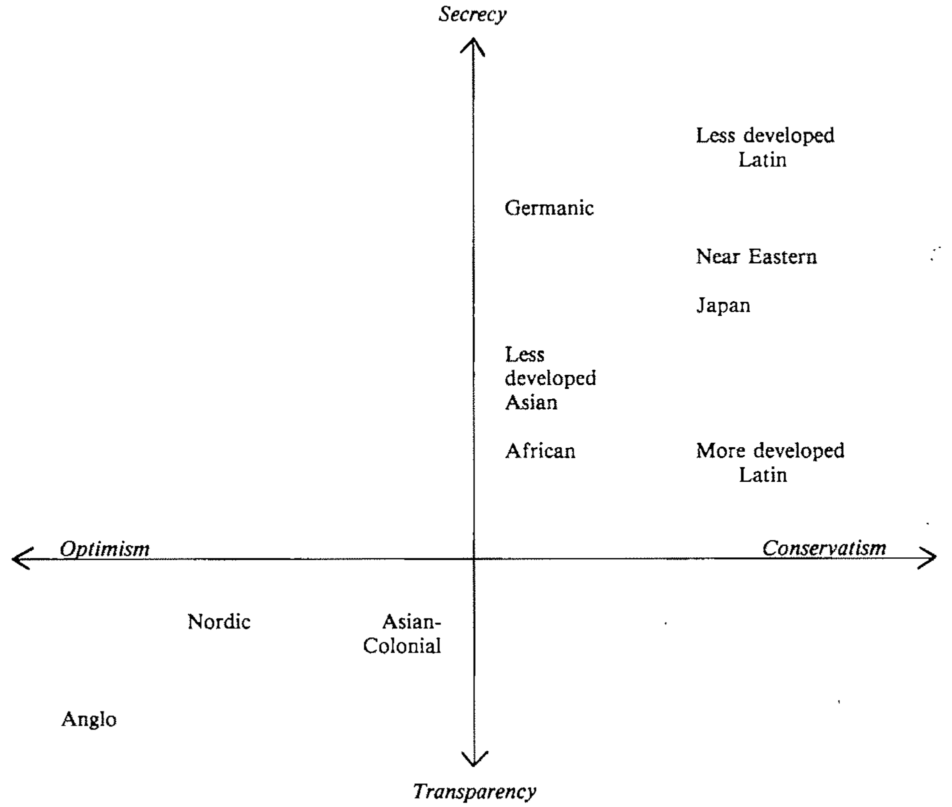
Accounting values most relevant to the measurement practices used and the extent of information disclosed are self-evidently the conservatism and secrecy dimensions. Accordingly, these can be combined and the classification of culture areas hypothesized on a judgmental basis as shown in Figure 4. In making judgments in respect of these

FIGURE 3
ACCOUNTING SYSTEMS: AUTHORITY AND ENFORCEMENT



classifications reference has also been made to the relevant correlations between value dimensions and the resultant clusters of countries identified from the statistical analysis carried out by Hofstede (1980, pp. 316, 324). Here there would appear to be a sharper division of culture area groupings with the Colonial Asian group relating more closely with the Anglo and Nordic groupings in contrast with the Germanic and more developed Latin groupings which appear to relate more closely to the Japanese, less developed Asian, African, less developed Latin, and Near Eastern area groupings.

FIGURE 4
ACCOUNTING SYSTEMS: MEASUREMENT AND DISCLOSURE



SUMMARY AND CONCLUSIONS

While prior research has shown that there are different patterns of accounting and that the development of national systems of corporate financial reporting is related to environmental factors, identification of the patterns and the influential factors involved remains controversial. The significance of culture in this context is far from clear and has been a relatively neglected issue in the development of ideas about international classification.

In this paper, a framework for analysing the impact of culture on the development of accounting systems internationally has been proposed. Value dimensions at the accounting subculture level have been identified, that is, professionalism, uniformity, conservatism and secrecy. These have been linked to cultural value dimensions at the societal level and hypotheses have been formulated for testing. Classifications of country groupings by culture area have also been hypothesized as a basis for testing the relationship between culture and accounting systems in the context of systems authority and enforcement characteristics on the one hand, and measurement and disclosure characteristics on the other.

Following this analysis, empirical research now needs to be carried out to assess the extent to which there is in fact a match between (a) societal values and accounting values, and (b) the proposed classification of country groupings, based on cultural influence, and the groupings derived from an analysis of accounting practices related to the value dimensions of the accounting subculture. However, for this to be feasible, further work to operationalize the link between accounting practices and accounting values will be necessary, and the relevant cross-cultural data assembled and organized.

In interpreting the results of empirical research relating to culture, the influence of any change factors will also need to be taken into account, bearing in mind the existence of external influences arising from colonization, war, and foreign investment, including the activities of multinational companies and large international accounting firms.

While much work lies ahead, this paper is offered as a contribution towards a theory of cultural influence on the development of accounting systems internationally. In doing so it is fully recognized that the ideas advanced are exploratory and subject to empirical testing and verification.

REFERENCES

Arpan, J. S., and L. H. Radebaugh, *International Accounting and Multinational Enterprises*, Wiley, 1985.

Barrett, M. E., 'Financial Reporting Practices: Disclosure and Comprehensiveness in an International Setting', *Journal of Accounting Research*, Spring 1976.

Beeny, J. H., *European Financial Reporting—West Germany*, ICAEW, 1975.

———, *European Financial Reporting—France*, ICAEW, 1976.

Choi, F. D. S., and G. G. Mueller, *International Accounting*, Prentice-Hall, 1984.

Douglas, M., *Cosmology: An Enquiry into Cultural Bias*, Royal Anthropological Institute, 1977.

Frank, W. G., 'An Empirical Analysis of International Accounting Principles', *Journal of Accounting Research*, Autumn 1979.

Gray, S. J., 'The Impact of International Accounting Differences from a Security Analysis Perspective: Some European Evidence', *Journal of Accounting Research*, Spring 1980.

Gray, S. J. and A. G. Coenenberg (eds), *EEC Accounting Harmonisation: Implementation and Impact of the Fourth Directive*, North Holland, 1984.

Harrison, G. L., and J. L. McKinnon, 'Cultural and Accounting Change: A New Perspective on Corporate Reporting Regulation and Accounting Policy Formulation', *Accounting, Organizations and Society*, Vol. 11, No. 3, 1986.

Hofstede, G., *Culture's Consequences*, Sage Publications, 1980.

———, 'Dimensions of National Cultures in Fifty Countries and Three Regions', in J. B. Deregowski, S. Dziurawiec and R. Annis (eds), *Expiscations in Cross-Cultural Psychology*, Swets and Zeitlinger, 1983.

———, 'Cultural Dimensions in Management and Planning', *Asia Pacific Journal of Management*, January 1984.

Holzer, H. P. (ed.), *International Accounting*, Harper & Row, 1984.

Inkeles, A., and P. J. Levinson, 'National Character: The Study of Modal Personality and Sociocultural Systems', in G. Lindsey and E. Aronson (eds), *The Handbook of Social Psychology*, (2nd edn), Addison-Wesley, 1969.

Jaggi, B. L., 'The Impact of the Cultural Environment on Financial Disclosures', *International Journal of Accounting*, Spring 1975.

Kluckhohn, F. R., and F. L. Strodtbeck, *Variations in Value Orientations*, Greenwood Press, 1961.

McKinnon, J. L., *The Historical Development and Operational Form of Corporate Reporting Regulation in Japan*, Garland, 1986.

Mueller, G. G., *International Accounting*, Macmillan, 1967.

———, 'Accounting Principles Generally Accepted in the United States Versus those Generally Accepted Elsewhere', *International Journal of Accounting Education and Research*, Spring 1968.

Nair, R. D., and W. G. Frank, 'The Impact of Disclosure and Measurement Practices on International Accounting Classifications', *The Accounting Review*, July 1980.

Nobes, C. W., 'A Judgemental International Classification of Financial Reporting Practices', *Journal of Business Finance and Accounting*, Spring 1983.

———, *International Classification of Financial Reporting*, Croom Helm, 1984.

Nobes, C. W., and R. H. Parker, (eds), *Comparative International Accounting*, Philip Allan, 1985.

Parsons, T., and E. A. Shils, *Toward a General Theory of Action*, Harvard University Press, 1951.

Price Waterhouse International, *International Survey of Accounting Principles and Reporting Practices*, 1975.

Radebaugh, L. H., 'Environmental Factors Influencing the Development of Accounting Objectives, Standards and Practices in Peru', *International Journal of Accounting Education and Research*, Fall, 1975.

Seidler, L. J., 'International Accounting—the Ultimate Theory Course', *The Accounting Review*, October 1967.

Sterling, R. R., 'Conservatism: The Fundamental Principle of Valuation in Traditional Accounting', *Abacus*, December 1967.

Taylor, P., and S. Turley, *The Regulation of Accounting*, Blackwell, 1986.

Watts, R. L., 'Corporate Financial Statements: A Product of the Market and Political Processes', *Australian Journal of Management*, April 1977.

Zeff, S. A., *Forging Accounting Principles in Five Countries: A History and an Analysis of Trends*, Stipes, 1971.

ABACUS, Vol. 24, No. 1, 1988

M. J. R. GAFFIKIN

Legacy of the Golden Age: Recent Developments in the Methodology of Accounting

It is often suggested in the accounting literature that there was a distinct change in the methodology employed by accounting theorists/researchers around 1970. Nelson (1973) has referred to the 1960s as the 'golden age in the history of a priori research in accounting'. Since then, some have claimed a more scientific empirical methodology has been used. However, there are distinct similarities in the methodological presuppositions in both periods and it is argued in this paper that contemporary researchers have a debt to the 'golden age' theorists for introducing the requirement of a rigorous standard of argument for effective and reliable accounting knowledge.

Key words: Accounting Theory; Research; Scientific method.

In most of the discussions of methodology in the accounting literature there are similar presumptions. These presumptions are both ontological and epistemological. That is, they concern how the world is perceived and how knowledge of it can be obtained. There is a belief that there is a world of objective reality that exists independently of the researcher so that any theory can be subjected to exhaustive and conclusive testing against *neutral facts* (cf. Chua, 1986). Recently, there have been some reactions to this conventional wisdom but they have tended to the other extreme in which accounting is presumed to be just another social science for which almost any newly devised, relativistic social theory is a likely candidate for the ultimate in theoretical explanation. However, this paper is an historical study which traces the development of the notion of methodology in the mainstream theoretical accounting literature since 1955. It shows that, despite the different research methods employed, because the ontological and epistemological presuppositions are the same, the methodological underpinnings have remained fairly constant. If this is true, the basis of recent authors' claims to reliable knowlege can be subjected to the same criticism as their predecessors.

PREHISTORY

The period since 1955 has witnessed an apparently increasing *awareness* of methodology by accounting authors/researchers. In the first fifteen years, four people

---

M. J. R. GAFFIKIN is Professor of Accounting, The University of Wollongong.

stand out as having made the most significant contributions to this increasing methodological sophistication: Chambers, Mattessich, Devine and Sterling. It was Chambers who provided the seminal work (1955a) but this was soon followed by Mattessich's early contributions. Sterling's work dates from later in the period. In addition, all three also contributed major theoretical treatises during the period and are still making positive contributions through their continued writings. On the other hand, Devine's contribution is as a commentator, but largely because he publicly published little until recently, it has been difficult to assess his direct contribution.

Carl Nelson has, somewhat lyrically, referred to the 1960s as 'the golden age in the history of a priori research in accounting' (1973, p. 4). It is an expression which has gained popular 'acceptance' (e.g., Mattessich, 1984, p. 29; Wells, 1976, p. 471; and many others). If the 1960s are to be so described then Mattessich's term for the preceding five years seems apposite: the 'preparatory phase' (1984, p. 29). It is, he argues, characterized by two articles by Chambers (1955a, 1957) and two by himself (Mattessich, 1956, 1957). Others agree that Chambers' first article, 'Blueprint for a Theory of Accounting', was indeed seminal: Yu (1976, p. 99) describes it has having since 'rendered a tremendous impact upon accounting thinking', and Henderson and Peirson (1983, p. 128) as 'the first of a series of articles which were to exert a considerable influence on accounting research and the development of accounting theory'.

Chambers

The first feature of Chambers' (1955a) article to be noted is his call for methodological monism – the appliction of the methodology employed by scientists as being suitable for *all* theoretical investigation. A second feature is his forceful rejection of the then dominant (or perhaps more accurately the *only*) methodology of descriptive-induction – the process of justifying and explaining current practice. To Chambers the fundamental premises of a theory of accounting lie outside the field of accounting proper. He suggested four closely interrelated premises as the basis of a sound accounting theory. First, accounting entities are collaborative systems, which, secondly, are rationally managed, thirdly, by recourse to current and relevant financial information, and fourthly, the derivation of which is a service function. He claimed that the first two propositions (premises?) are the result of 'observations from reality' (p. 20), the third is an assumption and the fourth a corollary of the second and third.

Later in the article (1955a, pp. 21-3) the second premise is discussed as an assumption. It is difficult to see how any of the premises can be the result of observation as the term is usually used in methodological discussion. Certainly, no *formal* empirical investigation is claimed to have taken place. There are, in fact, two propositions in the first premise: first that there are accounting entities and, secondly, that they exist as 'collaborative systems'. The first proposition is uncontroversial and almost all accounting commentators would accept it – such that it is almost axiomatic. This can be noted from most introductory accounting textbooks in which the 'accounting entity' notion is promoted as a fundamental principle. But not so many accept the second proposition. The notion of system is ill-defined in the literature and subject to many and varied interpretations. The idea of a system is based on certain epistemological and ontological presuppositions. The idea of a system is a formal, positivist notion. If a system is viewed as a group of related elements, organized for a purpose, it is necessary to be able to distinguish its boundaries and be aware of its purpose. Boundaries are invariably arbitrarily (but conveniently or expediently) defined. Purpose can only be determined from a set of social and political presuppositions. Consequently, it is difficult to imagine the first premise (comprising the two propositions) as being *observable* in the normal empirical (i.e., sensory) context. Rather, it is Chambers' perception of the firm.

Rationality, the second premise, is no more than a convenient assumption (as used in economic analysis).[1] It too is subject to interpretation. For example, it can be argued that all actions are rational to the actor. But how does an external party observe (or even comprehend) the action as being *rational*. This can only be achieved by some imposed universal standards; there are no such standards. Individual economic rationality (materialistic hedonism) is not necessarily rational for a society or economy as a whole (an obvious example is the case of the pollution resulting from the activities of 'economically rational' producers). There may well be conventionally accepted standards of management behaviour but they cannot be claimed to be standards of rationality. Ineffective and unsuccessful managers cannot be said to be *irrational*; they may simply have 'limited horizons'.

The third premise is admitted as an assumption. And if the fourth derives its meaning from the second and third, while it may logically follow, any successful denial of the prior assumptions and premises would also entail the rejection of this premise.

Thus, while alluding to a theory of scientific rigour, the argument can only be admitted as a set of tentative hypotheses based on a priori assumptions. In view of the article's title—the allusion to a *blueprint*—no doubt Chambers was well aware that the argument was far from complete. Its importance to the development of accounting theory lies in its call for methodological rigour. Any first attempt is likely to be tentative. Three subsequent articles were to indicate the rigour which became the hallmark of Chambers' work. The first two (1955b, 1957) were direct 'follow-ups' of the first article, expanding on some earlier points and rebutting some criticism of that first article. The discussion in the third (1960) indicated his increasingly sophisticated awareness of methodology. In all three he continued the call for the *scientific* study of accounting and it became increasingly clear that the formal methodology to which he was alluding was hypothetico-deductivism.

Throughout Chambers' prolific contributions to the accounting literature is the thread of a theoretical development. With hindsight it is apparent that these early works were leading to his *opus magnum, Accounting, Evaluation and Economic Behavior* (1966a). Nevertheless, it is at least these *four* (not two, as Mattessich suggests) works that comprise Chambers' contributions to the 'preparatory phase'.

---

[1] For example, Wible says, 'Rationality is the most pressing issue now facing economic science. Different conceptions of rationality may be the major issue dividing post-Keynesians from monetarists and rational expectations theorists' (1984, p. 89).

Mattessich

No continuous (substantive) thread is readily apparent in Mattessich's work and it could be argued that it is a little disingenuous of him to equate his early contributions with those of Chambers. Throughout his work Mattessich has appeared as an 'explorer' and a synthesizer. The two works in his 'preparatory stage' (1956, 1957) seem designed to suggest alternative sources of methods for accounting theorists. The first, 'The Constellation of Accountancy and Economics', draws on work by economists in national income accounting which, he suggests, might be suitable for improving the standard of financial accounting. If similar methods are employed in both areas then it would be possible to integrate national income accounting with business accounting. The second article, 'Towards a General & Axiomatic Foundation of Accountancy—with an Introduction to the Matrix Formulation of Accounting Systems', as its title suggests, employs matrix algebra to attempt an axiomatic foundation for accounting. It is through this that he claims to have derived and proved eight fundamental theorems (cf. Mattessich, 1980).

It would be a gross oversight not to stress the originality of Mattessich's second article and it is understandable that he is a little 'dismayed' at the lack of attention it has received in the literature (Mattessich, 1980, p. 160). In light of the widespread development of computerized accounting systems this work was way ahead of its time. But, like so much of his work, although there is an obviously sophisticated appreciation of the philosophical and mathematical characteristics of the methodology, too many matters of subject-substance are left unresolved. In an early examination of the article, Chambers (1962) arrives at a conclusion similar to this but he expectantly anticipates their resolution in subsequent work by Mattessich. Both Mattessich's works are directed to *methods* rather than methodology and, unlike his later work, no philosophical framework is developed (or explored).

The hallmark of the methodological work in the 'preparatory stage'—represented by the works of Chambers and Mattessich—is the denial of the arbitrary presumption of theory as the mere description of good practice and the appeal to what was understood to be the application of scientific rigour to accounting research and theory construction.

THE GOLDEN AGE

In terms of the sheer weight of contributions to the debate, the 1960s decade is indeed a 'golden age'. The journals abound with contributions directed towards methodological debate. Several major theoretical works emerged. To an outside observer it would seem that the *extent* of the debate on methodology indicated the birth of accounting as an intellectual discipline. Taking their cue from the work of Chambers and Mattessich, authors appealed to various philosophical notions in an attempt to determine the most well-reasoned foundations for the subject. While the philosophical content of some contributions might best be described as 'undergraduate', in some it was sophisticated and esoteric. For example, Deinzer's (1965, pp. 27-54) appeal to Dewey and Nagel is quite detailed; so too are the discussions of philosophy in most of Devine's work (1985a, 1985b, 1985c, 1985d, 1985e).

The following article titles appeared: 'Metaphysics of Pragmatism and Accountancy, (Dopuch, 1962); 'Absolutism and Accounting Theory' (Green, 1966); 'Axiomatic Method and Accounting Science' (Spencer, 1963); 'Accounting, Systematized Learning, and Economics' (Flanders, 1961); and 'Indications of Pragmatism and Empiricism in Accounting Thought' (Beams, 1969). It is easy to agree with Nelson when he says that 'there is no question that the general quality of papers published during this decade was higher than in the past. There may have been few new ideas expressed, but at least they were stated in a more felicitous manner' (1973, p. 17). It is not clear what he means by 'new ideas'; perhaps the same statement can be made about accounting since Pacioli? There certainly were 'new ideas' about how best to study accounting!

Major Works

However, the decade also saw the publication of many major theoretical works. They included those by Edwards and Bell (1961), Mattessich (1964), Chambers (1966a), Ijiri (1967), Bedford (1965) and the American Accounting Association's ASOBAT (1966). The structure of Edwards and Bell's work has been compared to that of a Gothic cathedral (Mattessich, 1984, p. 31); a rather flattering and grandiose analogy, used because in both, one element inevitably depends on and grows out of the other. The former pivots on two hypotheses: the current replacement value hypothesis and the classificational hypothesis of separating operating and holding gains. From these, Mattessich (1984) claims the authors develop 'a broad spectrum of individual consequences' (p. 31). Intuitively it would seem fair to claim that Edwards and Bell held an advantage over other accounting writers/researchers. They were economists and thus were trained in a field of study held to be far more methodologically 'advanced' at that time: they were missionaries from a more sophisticated society.[2] They were certainly received as bearers of 'the good word' for they exerted a considerable influence on accounting research for some time (see Heck and Huang, 1986).

The works by Mattessich, Chambers and Ijiri have all been described as major *postulational attempts* (Mattessich, 1980, pp. 160-1). Therefore, methodologically, they are similar. Substantively, they are quite different. There is little doubt that Mattessich was well-read in methodological-philosophical matters (evident in this and his other works). It is equally apparent that his book was developed with a conscious methodology. The methodology was that which he saw as dominant in scientific research as described in the philosophy of science literature. Thus, despite it being described as postulational, it is a good example of the methodology described by Suppe (1977) as the 'Received View': essentially, one derived from notions of dominant logical empiricists. More specifically, his methodology is essentially hypothetico-deductivism.[3] Mattessich seems to have been over-conscious of the value of formal methodology and the work suffers from being 'forced' to fit methodological requirements at the expense of more fundamental, substantive analysis. This is the essence of Chambers' criticism of the book (1966b) and, presumably, what he meant by, 'It may well have been for him [Mattessich], and it may be for his readers, more pleasant to travel hopefully than to arrive' (p. 118).

---

[2] This deference to economists by accountants has been persistent and is particularly strong today: many researchers prefer to be called 'financial economists' rather than 'accountants'. Yet accounting has always been concerned with the financial features of economics. Recently, Watts seemed to go to great lengths to point out that accounting had 'attained a degree of academic respectability among economists', had 'gained the respect of economists', dealt with topics that have 'attracted the interest of economists', and above all had motivated economists to attend accounting conferences! (1983, pp. 67-8).

In true academic style, Mattessich has claimed Chambers (and others) misunderstood, indeed 'failed to comprehend or appreciate' (1984, pp. 32-3), the work and he has in turn criticized Chambers' work, claiming that: 'Whereas I tried to infer inductively the basic assumptions by studying various extant micro- and macro-accounting systems . . . . Chambers started from a preconceived, and to my mind, dogmatic objective' (p. 162). Chambers was equally well-read in methodological and philosophical matters. He too developed his theory with a fully conscious methodology, and like Mattessich, one which he perceived as being the *true method of science*. It, too, is the hypothetico-deductivism of the Received View: a dogmatic methodology, but essentially the same as that employed by Mattessich. Despite their debate they were on similar methodological ground.

The use by Chambers (1966a) of the syllogistic argument at the end of each chapter serves to reinforce the belief that he employed hypothetico-deductivism. His argument is analytically derived from basic assumptions (postulates) which he claims are derived from his observations of the business world, together with notions generally accepted in economic theory. This is the method Mattessich refers to as being postulational. It is, as mentioned above, the same as that employed by Mattessich, even in the significant derivation of hypotheses. Their postulates are statements of so-called 'universal laws' (for example, economic rationality) and statements of antecedent conditions (what they *observed* to be facts of the economic world – some apparently 'more dogmatic' than the others).

Of the other major works produced in this period, despite its mathematical rigour, Ijiri's work (1967) is not as general as Chambers' and Mattessich's. Whereas they were concerned with general theories of accounting, Ijiri was attempting a theoretical justification of historical cost 'valuation' (his term). Like the others it is postulational – it relies on certain assumptions (axioms) from which conclusions are deduced. Similar comments could be applied to Bedford (1965) in his attempt to provide a theoretical basis for income.

Methodological Commentary

Chambers and Mattessich are scholars who resorted to philosophy (including

---

[3] Hypothetico-deductivism takes the form:

$$\begin{array}{c} L_1, L_2, \ldots . L_r \\ \underline{C_1, C_2, \ldots .C^k} \\ E \end{array}$$

Where L represents a universal law, C a statement of antecedent conditions, and E the description of phenomena.

P, 6751

philosophy of science) with a view to utilizing a sound methodological framework for their accounting theories. Devine seems to have been little concerned with developing any theory. He has written only one *major* work and, until recently, very little of what he wrote was publicly available (three volumes of his essays were published privately by him and privately circulated). He seems to have taken some private pleasure in the personal pursuit of a philosophical analysis of accounting. He is, insofar as accounting is concerned, best viewed as a commentator, a philosophical analyst. Nevertheless, through his teaching and seminar presentations he can be seen to have influenced others.

Devine makes clear his view of scientific theory construction early: 'Scientific method is composed primarily of the interaction of deductive methods and the philosophical doctrine known as empiricism' (1960, p. 392). In this, and other comments, it is readily apparent that he sees hypothetico-deductivism as *the* method of science more clearly than any other accounting writer up to and of this time. However, in respect of accounting, other factors intervene. He supports the symmetry thesis and quotes both Ayer and Friedman (p. 395) as supporting the need for prediction. But he also argues for operationalism – 'an extreme application of empiricism' – especially in respect of definitions.

Having made his case for scientific method for research, Devine draws attention to weaknesses in it. He cautions against the belief in objectivity of observations. This is important for the profession of independent auditing. However, although 'we have made progress in applying statistical theory to verification . . . the problems of evidence, proof and verification are far from solved' (p. 395). Other disciplines also have this problem and in accounting it is only likely to be solved by recourse to outside disciplines. In fact, accounting has all the 'problems of science' plus 'normative and psychological problems that the physical sciences do not ordinarily possess', and accountants should turn to other disciplines to investigate how the problems may be mitigated. They should utilize 'all the intellectual tools available'. 'To neglect the contribution of historically more mature branches of knowledge is to squander resources' (p. 394).

Devine's advice is extremely 'modern', that is, still pertinent today. Even more so when considered in conjunction with what he continues to claim. It concerns what he sees as the inevitable normative aspects of the discipline. Here the positivist scientific methodology is useless: we 'cannot expect to derive the usual crisp benefits from the application of formal logic'. In fact, he concludes: 'The benefits of scientific method cannot be seriously questioned, but scientific method cannot solve all the problems of society'.

Bedford and Dopuch (1961) criticize Devine (1960) for adopting a piecemeal approach to his subject, overlooking important interrelations and abstracting from normative considerations. However, neither their paper nor Devine's are presenting theories of accounting but merely discussing methodological considerations necessary for theory formation. As Bedford and Dopuch were 'trained' by Littleton, the chief propagandist of inductivism, we might have expected that they would have laid emphasis on inductive processes. In fact, with hindsight, in light of Dopuch's later absolute and dogmatic support of empiricist principles (as editor of *The Journal of*

Accounting Research — see Dopuch, 1979), it would seem only natural. However, this was not so; they only mildly chide Devine for what they see as his overemphasis on deductive reasoning but offer no real substitute. Consequently, it boils down to a debate over assumptions, or, more specifically, perceived structural elements.

A large part of Devine's other work is concerned with philosophical investigations. Even more than Mattessich, he seems more interested in examining some of the intellectually richer aspects of epistemological enquiry than developing a theory of (or for) accounting. In his collection of essays he examines a wide range of topics related to this sort of enquiry — areas such as functionalism, teleology, existentialism, phenomenology, logical positivism and many other philosophical positions. And although he attempts to explain the significance of a knowledge of them for developing accounting theories, he does not attempt to construct an accounting theory.

Not only are the subjects esoteric, as stated above, the essays were not (until very recently) available generally, so any attempt to assess his immediate influence has been limited. Unlike the other authors discussed, his ideas have not been subjected to the critical appraisal of commentators (e.g., book reviewers) which, for those interested in methodology at least, is unfortunate as he seems to have been one of the scholars best versed in contemporary philosophy (and the philosophy of science).

Although it had been written ten years previously, 1970 saw the publication of Sterling's major work, *Theory of the Measurement of Enterprise Income* (1970a). Sterling had, through some of his earlier published material, given notice of his interest in and familiarity with many of the philosophical aspects of methodology. His book, therefore, was a tightly developed, methodologically conscious theory of accounting income. Its conclusions are very similar to those of Chambers (1966a) and both authors have been recognized as the chief advocates of exit-price, market value accounting. Sterling is an avid exponent of methodological monism (as the title of the later work makes explicit — 1979). He is opposed to the inductive, naive empiricism of earlier accounting writers (1967, p. 96) and in this respect is aligned with writers such as Chambers, Mattessich and Devine. He is perhaps the first accounting theorist to allude to the widely known notions of Thomas Kuhn (Sterling, 1967, p. 99),[4] yet his view of theory construction is dependent on Hempel's deductive-nomological form, a version of the Received View (e.g., 1967, 1970b). Despite its more 'personalistic' approach, this influence is still dominant in his work (1979).

By the end of the 'golden age of a priori' there had been much methodological soul-searching by accounting writers and there had been several major theoretical works produced. There seemed to be general agreement that earlier (pre-1955) attempts had been methodologically misguided or even methodologically naive or, worse, bereft of any semblances of methodology. They had been the results of naive induction. Actually they often were not even that — merely assertions of highly regarded authorities. The prospect of the further development of accounting ideas was seen to lie in the application of the rigour of scientific method. This was found in the various guises of logical empiricism/positivism. A variety of terms were (and are) used to describe these 'methods'. In Nelson (1973) they were a priori, to others they were postulational (Mattessich, 1984), and generally they have been referred to as normative or deductive. Not all are accurate descriptions but relate to features of the methods. Today there are distinct pejorative overtones to those descriptions and in many accounting circles it is an intellectual insult to be called 'merely normative'. Such are the winds of fortune; and fashion. Many of the great accounting thinkers who brought their descipline from the barren, intellectual wilderness are very often not even memories to the contemporary 'whizz' researcher. In today's mainstream literature very few references are made to them or their work.

---

[4] That is the Kuhnian model described in terms of discontinuous progress in scientific knowledge through revolution. Chambers (1966a) also alludes to Kuhn but it is to his earlier work, *The Copernican Revolution* (1957).

METHODOLOGICAL PRESCRIPTION

In all fields of endeavour there are going to be some indidivuals who will be able to exert considerable influence. In academe a journal editor could be such a person. They can be viewed as being to researchers what patrons were to artists. Thus editors of *The Accounting Review* can be to accounting researchers what the Medici family were to Florentine Renaissance painters. As a long-time editor of the *Journal of Accounting Research* (*JAR*), Nicolas Dopuch has been such a patron. His influence is evident in his comments that, as editor of *JAR*, he sought to kill 'the traditional form of nomative theorizing' (1979, p. 80). Presumably he rejected any work which *he* considered to be 'normative theorizing'. Therefore, he can be cited as an important factor (albeit a political not an intellectual one) in the list of reasons for the dramatic shift in the research methods employed in accounting that took place around 1970. (Watts has arrived at a similar conclusion—1983, p. 72.)

There are other reasons and Dopuch suggests some. To him 'the dominance of various research methodologies seems to be a function of the time' (1979, p. 70). Consequently, 'high-speed computers and information "tapes"' made Ball and Brown's study (1968) possible. It is from about this time that accounting researchers (as doctoral students) were required to undergo formal training programs in the use of such modern research tools. This was accompanied by training in mathematics and logic (or statistical research techniques and hypotheses testing). Both the new technology and the increased statistical awareness needed data. One important source was the stock market with 'the ability of the capital market to process information quickly and in an unbiased manner' (Dopuch, 1979, p. 75). By borrowing recent developments from finance theory, accounting researchers were encouraged to 'experiment'. The purpose and nature of accounting were from that time perceived differently from those of the 'golden age' theorists. Accounting information (financial reporting) was not so much for general use but for the specific interests of investors. 'Experiments' took the form of determining investor (share market) reactions to different bits of and changes in accounting information.

Hendriksen (1982) concurs with this view and claims that the change in research and thought came about 'largely because of the rapid increase in the number of accounting researchers qualified in statistical and other quantitative research techniques and the availability of the computer' (p. 52). Mattessich (1984, p. 36) adds another reason for the shift from the postulational (or a priori) to this specific form of empirical research. He claims it was 'an inevitable reaction to the heavy emphasis upon a priori and analytical research' in accounting at that time.

Thus, there are technical and emotional reasons for the shift in research orientation. The question is, was there a shift in the philosophical viewpoint? That is what is of concern here.

As commentators on the development of accounting thought, Henderson and Peirson (1983) have described the shift as one to the use of 'scientific methodology'. They cite E. H. Caplan as describing the scientific method: the identification of a problem, the accumulation of relevant data, the formulation of hypotheses from the data, and the empirical testing of the hypotheses (p. 211). It is somewhat surprising that Henderson and Peirson make this claim after having devoted considerable space in previous chapters to the notions of Kuhn, Popper, Lakatos and Chalmers: their second chapter is entitled 'The Scientific Method and Progress in Science'. In fact they even suggest that the first two steps listed by Caplan (above) would normally be reversed. Apparently it is possible to collect '*relevant* data' before 'identifying a problem'. Having collected the data and identified a problem it is then possible, presumably through pure induction, to formulate hypotheses and, after all that, to *test* empirically the hypotheses.

However, what they describe is an abbreviation of what is described in the far more influential—almost authoritative—work by Abdel-khalik and Ajinkya (1979). Their work is published by the major international academic accounting body, the American Accounting Association. It developed from courses given at annual and other meetings of that body and at several universities. Its final form benefited from critical comments of many important educators and researchers. All this suggests that the work is sufficiently highly regarded to be able to exert a strong influence on research leading to theory development. The authors suggest a sequence of steps as being ideally suited to the development of a sound research program.

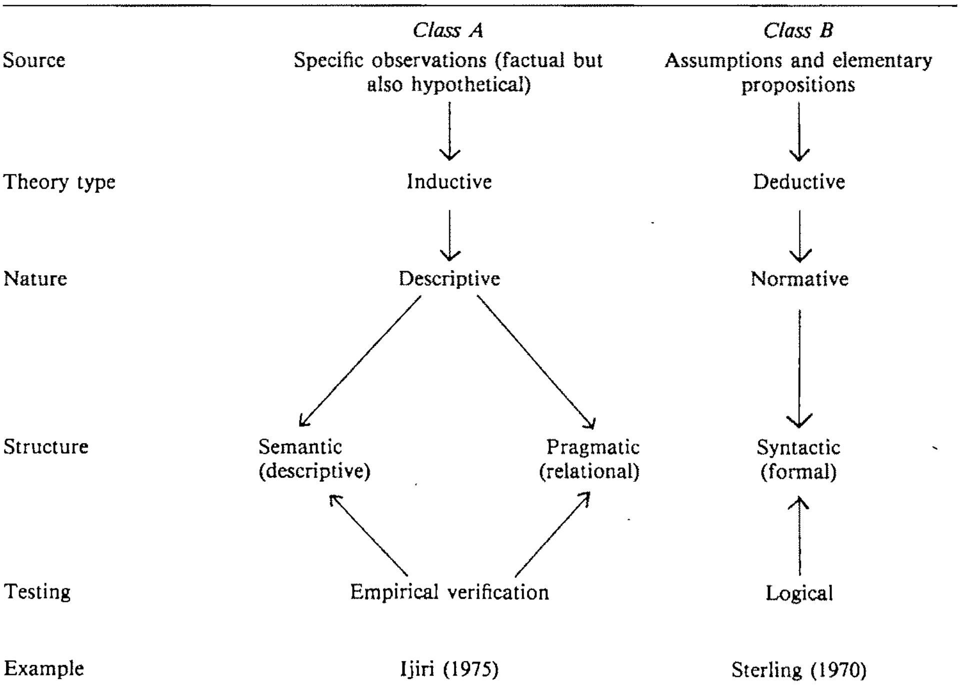
1. Identify the research problem.
2. Develop the conceptual and theoretical structure, including causal links and chains.
3. Operationalize the theoretical constructs and relationship and state the specific hypotheses to be tested.
4. Construct the research design.
5. Implement this design by sampling and gathering data.
6. Analyse observations in order to test hypotheses.
7. Evaluate the results.
8. Consider and specify limitations and constraints.

Abdel-khalik and Ajinkya then provide an expanded discussion of some aspects of accounting research. First, they examine problem delineation. They comment on changing fashions in research which they see as being motivated not only by 'the interest in employing new tools and more rigorous research skills, but also by the development of new technology (e.g., computers and new statistical tools)' (p. 14). These new tools and technology have held new hope for the resolution of old problems, they suggest. This contrasts with Sterling's more cynical interpretation that it is accountants' contribution to the spirit of conservation – the recycling of old problems (1979, p. 4).

The authors next consider methodology. Drawing on ideas in the American Accounting Association's theory construction report (1971b) and some from Ijiri (1975), they suggest a description of some forms of theories. Schematically rearranged, the views of theories *they* have perceived in accounting appear as shown in Figure 1.

The type of theory construction will, they point out, determine the methodology and, although they do not explicitly state as much, it can be inferred that they prefer the Class A type because of its reliance on empirical observations (p. 16). However, they suggest accounting has been freer from controversy over methodology than other disciplines. The (same) sociological literature suggests conflict over the preferred use of the *scientific method* and *the naturalistic (or interactive) approach*. The essential difference lies in the former necessitating some sort of structure and controls in research design. The naturalistic approach rejects structure and, borrowing the concept of *grounded theory* (developed by Glaser and Strauss), holds that theory is *discovered* (Abdel-khalik and Ajinkya, 1979, pp. 16-17). They hold that naturalistic theory or, actually, grounded theory, is more common in accounting research than would commonly be believed. Its use is relevant where researchers do 'not know a priori the form or the structure' which the research techniques (for example, Box-Jenkins) will take.

FIGURE 1
TYPES OF THEORIES



The third topic subject to expanded discussion by the authors is the purpose and function of research. Their 'objectives' (*sic*) of research are to *describe*, to *explain* and to *predict* (p. 21). They distinguish between models and theories and admit to a total conviction in the essentiality of the notion of *causality*. From there they discuss techniques available to assist in the empirical verification of theories (the Class A type) in order to validate ('in the limited sense of that word', p. 29) the theory.

Abdel-khalik and Ajinkya's methodological tolerance is, in principle, admirable. However, casual observation of the accounting research results (journal articles and papers) tends to suggest their monograph has encouraged empirical study either directly or through the educational programs drawing on their work. It is not really possible to make such a claim (for their influence) other than by 'circumstantial evidence'. This takes the form of, first, the 'official sanction' of their work as mentioned above; second, through the numerous literature citations of their work; and third, their subsequent work—articles, conference and seminar participation.[5]

Irrespective of whether they have been influential, there has been an increase in empirically based research. Yet, as Mattessich has pointed out, 'in spite of highly sophisticated statistical techniques and rigorous hypothesis testing, a good deal of present-day empirical accounting research yields little more than self-evident results' (1984, p. 15). Mattessich believes that part of the reason for continuing this sort of research, despite these limitations, lies in the 'need for confirmation' which, given the relative intellectual (scientific) immaturity of the discipline, is a necessary prerequisite for further, deeper understanding. However, he is also aware of the poor training given to accounting researchers. This has allowed them to equate statistical *methods* with scientific *methodology*.

In this latter respect Mattessich is not alone. It is one of the preliminary criticisms Christenson (1983) levels at what he describes as the 'Rochester School'. Quoting Machlup he agrees that 'Semiliterates adopt the word when they are concerned neither with philosophy nor with logic, but simply with methods' (p. 2).

Towards a Positive Accounting Theory?

The apogee of the uncritical rejection of so-called normative theorizing is manifest in the work of the Rochester School. Three of its members' articles won awards: two the AICPA award for a Notable Contribution to the Accounting literature (Watts and Zimmerman, 1978, 1979) and one the Competitive Manuscripts Award of the AAA (Zimmerman, 1979). It is not unreasonable to presume they have, therefore, been influential. But as Christenson (1983) says, 'That these articles are considered "top of the heap" is . . . a sad commentary on the standards used in evaluating contemporary accounting research' (p. 2).

The main thrust of the Rochester School is a call for positive research in accounting. Past attempts to construct accounting theories have, according to them, been unscientific because they have been prescriptive, or *normative*, rather than *positive* or descriptive. It is a catchcry similar to that heard in the nineteenth century in economics. To anyone at all versed in philosophy generally, and economic or recent social science methodology in particular, this appeal to a 'naive, obsolete and outmoded philosophy' (Mattessich, 1984, p. 77) is unbelievable. They have attracted devastating criticism of their position (for example, by Christenson, 1983, and Lowe, Puxty, and Laughlin, 1983) but, casually shrug it off in a footnote (Jensen, 1983, p. 320); such criticism appears to have had little effect on accounting researchers eager to demonstrate that they are abreast of the methodological views they perceive to be 'most accepted'.

---

[5] For example see the paper by Tomkins and Groves (1983) and the subsequent discussion in which Abdel-khalik and Ajinkya participated.

Christenson's (1983) critique demonstrates that the members of the Rochester School are ignorant of the philosophical implications of their avowed stance. While they predominantly hold positivist positions they incorporate Popperian notions and, of course, Friedman-type instrumentalism. They are, he claims, *not* aware of the meaning of methodology which is necessarily normative (pp. 2-3). This last point is expanded upon in the critique by Tinker, Merino and Neimark (1982). They argue from a perspective of social theory and make several valid methodological criticisms of the positive theory view. For example, one of the major claims of positive theorists is the achievement of greater objectivity—value freedom. However, by starting with assumptions they are making value judgments on which the remainder of their research rests. An even more ambitious and far-reaching critique is provided by Lowe, Puxty, and Laughlin (1983). They claim to show that one of Watts and Zimmerman's papers (1979) is defective because: the methodology and testability is suspect, the applicability of the evidence to the propositions cited is questionable, and contrary evidence is given to rebut the theory. In light of these convincing critiques it is somewhat mystifying why the call for positive theories persists. Mattessich (1984) suggests that it 'filled a deep psychological need in many young academics trained in rigorous methods and influenced by the conservative Chicago school of economics' (p. 77). However, he suggests that this fervour is 'based on several misconceptions':

1. many authors fail to comprehend 'accounting in general' as an applied, hence conditionally prescriptive, discipline;
2. they seem to underrate the limitations to which any positive theory concerned with human preferences is subjected;
3. they do not fully grasp modern methodology and the obsolescence of positivism;
4. some of them even fail to realize that not only a theory, but no research activity, can be free of value; and
5. they apply the term 'theory' indiscriminately also to hypotheses, models, and standards (p. 77).

Despite this criticism and also that levelled at Friedman's position by economic methodologists (for example Caldwell, 1982; Coddington, 1972 and Katouzian, 1980), research purporting to be positive accounting continues to be undertaken (cf. Watts and Zimmerman, 1986).

Schreuder (1984a) suggests that 'the terms of "positive" and "normative" have been used in so many different contexts that they have lost all clarity of meaning' (p. 215). To be normative a theory *must* contain value judgments. Therefore, one cannot argue that a theory is normative because it has not been tested: it must be shown to be untestable. As used in accounting, and especially by the Rochester School, 'positive as applied to theory is basically a misnomer: it should be replaced by "empirical" ' (p. 215).

It is interesting to note, partly by way of an aside, that although the first call for positive theorizing is attributed to Jensen in 1976 (Christenson, 1983, p. 1), others had made similar appeals. There is a similar appeal throughout the work of Devine (1971) and in Goldberg's work (1970). For example, Devine says, 'The adequacy of theories is judged in terms of correspondence between predicted outcomes and actual outcomes' (1971, p. 1). And Goldberg says that, 'the ultimate success of a theory in this sense depends on its capacity to predict as well as to explain' (1970, p. 43).

Devine's quotation is a more definite restatement of the view propounded by Friedman to whom both make continual allusions. The major difference between their positions and the Rochester School is that they are making definite methodological statements. Both also seem aware of the instrumental/pragmatic foundations of positive theories. Both are aware of the limitations of positive analysis and caution against its uncritical acceptance. However, Rochester School theorists merely see positive theories as being comprised of value-free descriptions of 'what is' (cf. Watts and Zimmerman, 1986, pp. 8-9).

Thus, the development of Rochester School-type positive theories can be explained in terms of the push towards greater empirical content in accounting research. In attempting a rationale for this, adherents have taken some ideas from the work of John Neville Keynes and attempted to link them to the notion of positive economics developed by Friedman but with some of the interpretations of modern empiricism. It is highly probable that 'they' perceived economic methodology to be more sophisticated and satisfactorily developed than anything in accounting.[6] With their particular form of neo-classical economic (Chicago style) training, the path to a suitable methodology for developing accounting theory would have seemed obvious.

METHODOLOGICAL SIMILARITIES

Since 1970 the greater part of research in accounting has been consciously empirical. Various reasons have been suggested for this (above). Generally speaking, empirical research has been *prescribed* as *the* only acceptable form of research. This prescription has been the result of strong influences exerted on researchers, directly or indirectly, from many quarters, including: the predilections of *some* journal editors; research training (degree requirements); research technology; 'official' research 'manuals' (e.g., Abdel-khalik and Ajinkya, 1979); research fashion-leaders (e.g., prizes to members of the Rochester School); and influential economic 'theories'.

The above are the less controversial suggested influences – there are probably many others. *Methodologically*, there is little difference between accounting research in this age of uncritical empiricism (post 1970) and that in the golden age of a priorism.

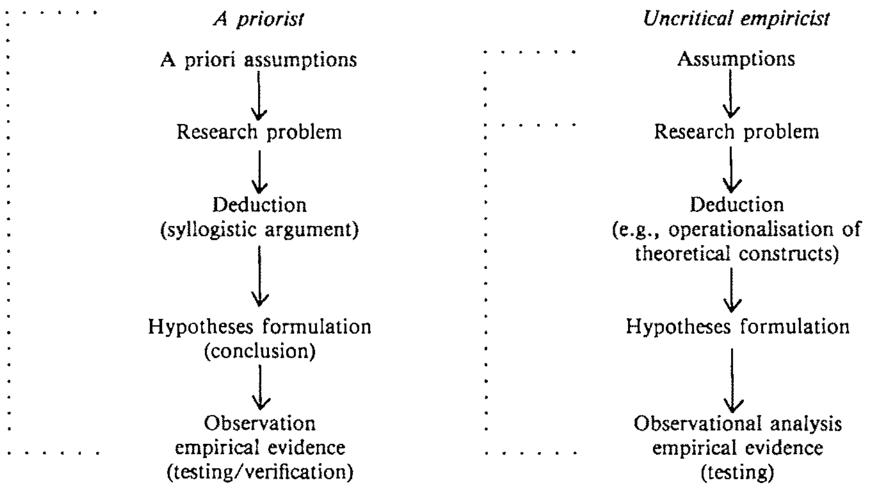
---

[6] This is implied by Watts and Zimmerman when they claim to be presenting 'the theory and methodology underlying the economics-based empirical literature in accounting' (1986, p. 13).

The main difference has been in respect of *research emphasis*. Recent research employs more seemingly sophisticated methods and techniques than golden age research but is equally steeped in positivist methodology. Research in the uncritical empiricism period rests on a more literal interpretation of certain tenets of logical empiricism. A golden age researcher would likely argue that he or she derived his or her a priori assumptions from *general* observation. In true hypothetico-deductive fashion the same field of empirical evidence is used to verify the hypotheses (theory). An uncritical empiricist similarly perceives a research problem through observation for which he or she will hypothesize (e.g., a problem solution; behavioural characteristics of observed group; etc.). Here too the same empirical field will confirm/verify/test the hypotheses but the data collected from the observations (for the latter purpose) will be more formally organized. Further assumptions will be made about the 'evidence'—concerning the statistical significance/merits of the data itself or the means and methods by which it was collected. On this basis he or she will argue that his or her results are more reliable than the a priorists.

In their barest essentials both methods may be shown diagrammatically as in Figure 2.

FIGURE 2
RESEARCH PROCEDURES



The greatest differences in procedures will be in relating the hypotheses to the observations. On this level of appreciation the positive-normative distinction breaks down. A priorists are said to be normative because they start from certain assumptions which they claim the theory *should* explain or justify. The uncritical empiricist, nowadays referred to as a positive researcher, is not really proceeding any differently. The selection of his or her problem and the possible solutions to it are equally *normative*. While the positive researcher may claim to be describing *what is* (e.g., Zimmerman, 1980), he or she is faced with the problem of induction described in the philosophy of science (see Suppe, 1977, for example, or Chalmers, 1982): it is not possible to describe 'what is' from the near-infinite variety of reality. Choices have to be made, 'reality' is relative. Any attempted description of it will be the result of the describer's perception of it. Thus, a believer in the competitive market price system may assert that accounting information is an economic good, but in so doing he or she is overlooking what someone else might see as essential differences between information, as representations of some thing/state, and the thing/state itself (the good). It is not possible to answer this question on the basis of induction. Assumptions are necessary and they arise from definitions, beliefs and value systems.

Positive accounting theory (of the type described above) is merely an extension of the general direction of accounting research since the late 1960s. It aspires to the same standards of scientific rigour that had been absent in earlier accounting research and theorizing. However, as Schreuder (1984b) has argued, it is a misnomer: it should be termed empirical. As with all research in the uncritical empiricist phase, its method is empirical, and its methodology is conventionalist, positivist empiricism. No more profound critique of its methodology is possible. As described by its proponents (for example, Zimmerman, 1980), it is not fully positive in the Friedman-sense and even if it attempted to be it would be subject to the criticism that methodology has attracted (cf. Caldwell, 1982).

Shared Philosophy

The claim that the methodology of the golden age and the uncritical empiricism period is essentially the same is made on the basis of their shared philosophical tenets. Any methodology is a product of philosophy; theories the realization of their methodologies. Methodology sets out the procedures to be used in the generation and/or in the testing of propositions by those wishing to obtain valid knowledge. However, methodology is derived from epistemology which is in turn determined by ontology. Whereas epistemology is a conception of the forms of knowledge that are possible and the conditions under which it may be achieved, ontology is a conception of what exists. Theorists in both periods share a realist ontology and a foundationalist epistemology.

Realism generally refers to the view that there is a world of material things in space which exist irrespective of anyone's awareness of them. There are shades of realist beliefs but naive or direct realism is a mechanistic belief that an observer can produce an unbiased conclusion from the environment. The work carried out in the age of uncritical empiricism (as described above) is based on such an ontology. However, when Chambers and Mattessich (and the others) talk of deriving postulates from observations of the real world, or claim their postulates as being fundamental (implying they are representative of an objective reality), they too are indicating a realist ontology.

A rationalist epistemology is one in which it is assumed that there is a rational order in the world. That is, its parts and the relations between them conform to concepts and the relations between them thus giving the essence of the world. Knowledge of the world can be gained through deduction rather than sensory experience. Hypothetico-deductivism, despite being an empiricist methodology, shares a similar perception of the world and is a foundationalist methodology.[7] A positive accounting researcher, in claiming to be attempting to explain 'what is', implies a realist ontology, a foundationalist epistemology. So too are those researchers of the 'golden age' (the a priorists): that is why a system of postulates can be interrelated and composed into a theoretical system.

Thus it is not on the basis of the fundamental philosophical foundations of their research that theorists in the 'golden age' and those in the period of uncritical empiricism can be distinguished. Rather, it is on the emphasis on research *methods* (cf. Figure 2). Whereas a 'golden age' theorist will state his or her assumptions as having been derived from casual observation and from the conclusions of others, the uncritical empiricist will claim a more systematic basis for his or her assumptions. That is, an uncritical empiricist will claim to be describing the real world on the basis of his or her measurements of certain features of it; the 'golden age' theorist is content to take these for granted.

IMPLICATIONS

In this paper, it was never intended to criticize the philosophical foundations of the accounting research in both the periods described above (cf. Chua, 1986). It was intended to demonstrate that similar positions are adopted in both periods. Thus, it is possible to subject the work in both periods to the same methodological scrutiny.

In both periods there is a presumption that the researcher is a dispassionate observer of accounting/economic 'reality' with no political, sociological or ethical ideals. Not only would these characteristics interfere with the 'search for truth', they can never be rationally justified. However, most scientific communities adopt a dominant value orientation. This becomes so well entrenched that it is difficult to challenge or change. These dominant entrenchments influence expectations as to what projects will lead to definitive, scientifically useful results. With the similar ontological and epistemological presuppositions in accounting research in both periods, it is little wonder that in neither periods have generally acceptable solutions to accounting problems been presented. The 'golden age' a priorists were considered to be on a fruitless journey. Their methods were replaced by those of the uncritical theorists. Yet even an ardent exponent of uncritical empiricism admits that 'no empirical study by itself can provide conclusive evidence on an issue' (Dopuch, 1979, p. 76).

REFERENCES

Abdel-khalik, A. R., and B. B. Ajinkya, *Empirical Research in Accounting: A Methodological Viewpoint*, AAA, 1979.

American Accounting Association, *A Statement of Basic Accounting Theory*, (*ASOBAT*), AAA, 1966.

———, 'Committee Report on "Foundations of Accounting Measurement" ', *The Accounting Review*, Supplement, 1971a.

---

[7] A foundationalist epistemological position is one that holds knowledge to have an incorrigible and certain basis. The positive methodological position described above is based on naive realism and is, therefore, foundationalist. Note also that the antecedent conditions of hypothetico-deductivism are often termed 'covering laws' implying a certain predetermined order to the world.

American Accounting Association, 'Committee Report on "Accounting Theory Construction and Verification" ', *The Accounting Review*, Supplement, 1971b.

———, *Statement of an Accounting Theory and Theory Acceptance*, (*SATTA*), AAA, 1977.

American Institute of Certified Public Accountants, *Report of the Study Group on the Objectives of Financial Statements*, AICPA, 1973.

Ball R., and P. Brown, 'An Empirical Evaluation of Accounting Income Numbers', *Journal of Accounting Research*, 1968.

———, 'Portfolio Theory and Accounting', *Journal of Accounting Research*, 1969.

Ball, R. and G. Foster, 'Corporate Financial Reporting: A Methodological Review of Empirical Research', *Journal of Accounting Research*, Supplement, 1982. (Discussion by N. J. Gonedes, M. C. Jensen, and 'A Reply').

Beams, F. A., 'Indications of Pragmatism and Empiricism in Accounting Thought', *The Accounting Review*, 1969.

Bedford, N., *Income Determination Theory: An Accounting Framework*, Addison-Wesley, 1965.

Bedford, N., and N. Dopuch, 'Research Methodology and Accounting Theory: Another Perspective', *The Accounting Review*, 1961.

Blaug, M., *The Methodology of Economics*, Cambridge University Press, 1980.

Butts, R. E., and J. Hintikka (eds), *Basic Problems in Methodology and Linguistics* [Part III, International Congress of Logic, Methodology and Philosophy of Science, University of Western Ontario, 1975], D. Reidel Publishing Co, 1977.

Caldwell, B. J., *Beyond Positivism: Economic Methodology in the Twenthieth Century*, George Allen & Unwin, 1982.

Chalmers, A. F., *What is this Thing Called Science?* (2 edn), University of Queensland Press, 1982.

Chambers, R. J., 'Blueprint for a Theory of Accounting', *Accounting Research*, 1955.

———, 'A Scientific Pattern for Accounting Theory', *The Australian Accountant*, 1955b.

———, 'Detail for a Blueprint', *The Accounting Review*, 1957.

———, 'The Conditions of Research in Accounting', *The Journal of Accountancy*, December 1960.

———, 'Changes in Accounting Theory', *Proceedings of Illinois Conference on Accounting Education for Collegiate Teachers of Accounting*, Chicago, 1962.

———, *Accounting, Evaluation and Economic Behavior*, Prentice-Hall, 1966.

———, 'Review Article—Accounting and Analytical Methods (R. Mattessich, 1964)', *Journal of Accounting Research*, v. 4, 1966b.

———, 'The Foundations of Financial Accounting', *Berkeley Symposium on The Foundations of Financial Accounting*, University of California, Berkeley, January 1967.

———, *An Autobibliography*, Occasional Paper No. 15, International Centre for Research in Accounting, University of Lancaster, 1977.

Christenson, C., 'The Methodology of Positive Accounting', *The Accounting Review*, 1983.

Chua, W. F., 'Radical Developments in Accounting Thought', *The Accounting Review*, 1986.

Coddington, A., 'Positive Economics', *Canadian Journal of Economics*, February 1972.

Deinzer, H. T., *Development of Accounting Thought*, Holt, Rinehart & Winston, 1965.

Devine, C., 'Research Methodology and Accounting Theory Formation', *The Accounting Review*, 1960.

———, 'Accounting—Toward a Suitable Philosophy', unpublished paper, February 1961.

———, *Essays in Accounting Theory*, v. III, privately published, 1971.

———, *Essays in Accounting Theory*, American Accounting Association (reprinted with original dates of private publication not disclosed); 5 volumes, 1985: Volume 1, 1985a, Volume 2, 1985b; Volume 3, 1985c; Volume 4, 1985d; Volume 5, 1985e.

Dopuch, N., 'Metaphysics of Pragmatism and Accountancy', *The Accounting Reveiw*, 1962.

———, 'Empirical vs. Non-Empirical Contributions to Accounting', in J. J. Davies (ed.), *Accounting Research Convocation*, University of Alabama, 1979.

Dopuch, N., and L. Revsine (eds), *Accounting Research 1960-1970: A Critical Evaluation*, Center for International Education and Research in Accounting, 1973.

Edwards, E., and P. Bell, *The Theory and Measurement of Business Income*, University of California Press, 1961.

Flanders, D. P., 'Accounting, Systematized Learning and Economics', *The Accounting Review*, 1961.

Friedman, M., *Essays in Positive Economics*, University of Chicago Press, 1953.

Gambling, T., *Positive Accounting: Problems and Solutions*, Macmillan Press, 1984.

Gilman, S., *Accounting Concepts of Profit*, Ronald Press, 1939.

Goldberg, L., 'Varieties of Accounting Theory' (1970), in Stone (1971).

Green, D., 'Absolutism and Accounting Theory', in *Aspects of Contemporary Accounting*, University of Florida Press, 1966.

Hakansson, N. H., 'Empirical Research in Accounting, 1960-70: An Appraisal', in Dopuch and Revsine (1973).

Heck, J. L., and J. C. Huang, 'Contributions to Accounting Literature: A Peer Assessment of Monographs', *Journal of Accounting Education*, 1986.

Henderson, S., and G. Peirson, *Financial Accounting Theory: Its Nature & Development*, Longman Cheshire, 1983.

Hendriksen, E. S., *Accounting Theory*, (4th edn), Richard D. Irwin, 1982.

Hopwood, A., and H. Schreuder (eds), *European Contributions to Accounting Research: The Achievements of the Last Decade*, Free University Press, 1984.

Hooker, C. A., 'Methodology and Systematic Philosophy', in Butts and Hintikka (1977).

Ijiri, Yuji, *The Foundations of Accounting Measurement*, Prentice-Hall, 1967.

———, *Theory of Accounting Measurement*, AAA, 1975.

Jensen, M. C., 'Organization Theory and Methodology', *The Accounting Review*, 1983.

Jensen, M. C., and W. H. Meckling, 'Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure', *Journal of Financial Economics*, 1976.

Kam, V., *Accounting Theory*, John Wiley, 1986.

Katouzian, H., *Ideology and Method in Economics*, Macmillan Press, 1980.

Kelly, Lauren, 'The Development of a Positive Theory of Corporate Management's Role in External Financial Reporting', *Journal of Accounting Literature*, 1983.

Kuhn, T. S., *The Copernican Revolution*, Harvard University Press, 1957.

———, *The Structure of Scientific Revolutions*, (2nd edn, enlarged), University of Chicago Press, 1970.

Lakatos, I., 'Falsification and the Methodology of Scientific Research Programmes', in Lakatos and Musgrave (1970).

Lakatos, I., and A. Musgrave (eds), *Criticism and the Growth of Knowledge*, Cambridge University Press, 1970.

Littleton, A. C., *Structure of Accounting Theory*, AAA, 1953.

Lowe, E. A., A. G. Puxty and R. C. Laughlin, 'Simple Theories for Complex Processes': Accounting Policy and the Market for Myopia', *Journal of Accounting & Public Policy*, 1983.

Lyas, C., 'Philosophers and Accountants', *Philosophy*, 1984.

Mattessich, R., 'The Constellation of Accountancy and Economics', *The Accounting Review*, 1956.

———, 'Towards a General & Axiomatic Foundation of Accountancy—with an Introduction to the Matrix Formulation of Accounting Systems', *Accounting Research*, 1957.

———, *Accounting and Analytical Methods*, Richard D. Irwin, 1964.

———, 'Methodological Preconditions and Problems of a General Theory of Accounting, *The Accounting Review*, 1972.

———, *Instrumental Reasoning and Systems Methodology—An Epistemologicy of Applied and Social Sciences*, D. Reidel, 1978.

———, 'On the Evolution of Theory Construction in Accounting: A Personal Account', *Accounting and Business Research*, 1980.

———, *Modern Accounting Research: History, Survey & Guide* (co-authored and edited). The Canadian Certified General Accountants' Research Foundation, 1984.

McCloskey, D. N., 'The Rhetoric of Economics', *Journal of Economic Literature*, 1983.

McCloskey, D. N., 'Sartorial Epistemology in Tatters: A Reply to Martin Hollis', *Economics and Philosophy*, 1985.

McDonald, D. L., *Comparative Accounting Theory*, Addison-Wesley, 1972.

Morgan, G., 'Social Science and Accounting Research: A Commentary on Tomkins and Groves', *Accounting, Organisations and Society*, 1983.

Most, K., *Accounting Theory* (2nd edn), Grid Publishing, 1982.

Nair, R. D., and T. H. Williams, (eds), *Perspectives on Research*, University of Wisconsin, 1980.

Nelson, C., 'A Priori Research in Accounting', in Dopuch and Revsine (1973).

Ohlson, J. A., and A. G. Buckman, 'Toward a Theory of Financial Accounting', *The Journal of Finance*, 1980.

Rorty, R., *Philosophy and the Mirror of Nature*, Basil Blackwell, 1980.

Rotwein, E., 'On "The Methodology of Positive Economics" ', Quarterly *Journal of Economics*, 1959.

Schreuder, H., 'Positively Normative (Accounting) Theories', in Hopwood and Schreuder (1984a).

———, 'Accounting Research and Practice', *Research Memorandum*, Limburg University, Faculty of Economics, 1984b.

Spencer, M. H., 'Axiomatic Method and Accounting Science', *The Accounting Review*, April 1963.

Sterling, R. R., 'A Statement of Basic Accounting Theory: A Review Article', *Journal of Accounting Research*, 1967.

———, *Theory of the Measurement of Enterprise Income*, Scholars Book Co, 1970a.

———, 'On Theory Construction and Verification', *The Accounting Review*, 1970b.

———, *Toward a Science of Accounting*, Scholars Book Co, 1979.

Stone, W. E. (ed), *Foundations of Accounting Theory*, University of Florida Press, 1971 (Papers given at Accounting Theory Symposium, March 1970).

Suppe, F., *The Structure of Scientific Theories* (2nd edn), The University of Illinois Press, 1977.

Tarascio, V. J., 'Value Judgements and Economic Science', *Journal of Economic Issues*, 1971.

Tinker, A. M., 'The Naturalization of Accounting: Social Ideology and the Genesis of Agency Theory', *Working Paper*, 83-14, New York University, April 1983.

———, *Paper Prophets*, Holt Rinehart & Winston, 1985.

Tinker, A. M., B. D. Merino, and M. D. Neimark, 'The Normative Origins of Positive Theories: Ideology and Accounting Thought', *Accounting, Organizations and Society*, 1982.

Tomkins, C., and R. Groves, 'The Everyday Accountant and Researching his Reality', *Accounting, Organisations and Society*, 1983.

Watts, R. L., 'Corporate Financial Statements, A Product of the Market and Political Processes', *Australian Journal of Management*, April 1977.

———, 'The Evolution of Economics-Based Empirical Research in Accounting', *The Emanuel Saxe Distinguished Lectures* 1982-1983, April 1983.

Watts, R. L. and J. Zimmerman, 'Toward a Positive Theory of the Determination of Accounting Standards', *The Accounting Review*, 1978.

———, 'The Demand For and Supply of Accounting Theories: The Market for Excuses', *The Accounting Review*, 1979.

———, *Positive Accounting Theory*, Prentice-Hall, 1986.

Wells, M. C., 'A Revolution in Accounting Thought?', *The Accounting Review*, 1976.

Wible, J. R., 'Towards a Process Conception of Rationality in Economics and Science', *Review of Social Economy*, October 1984.

Wilber, C., and R. Harrison, 'The Methodological Basis of Institutional Economics: Pattern Model, Story Telling, and Holism', *Journal of Economic Issues*, 1978.

Willer, D. and J., *Systematic Empiricism: Critique of a Pseudo-Science*, Prentice-Hall, 1973.

Wolk, H. I., J. R. Francis, and M. G. Tearney, *Accounting Theory: A Conceptual and Institutional Approach*, Kent Publishing, 1984.

Yu, S. C., *The Structure of Accounting Theory*, University of Florida, 1976.

Zeff, S. A., 'Comments on "Varieties of Accounting Theory" ', (1970) in Stone (1971).

Zimmerman, J. L., 'The Costs and Benefits of Cost Allocations', *The Accounting Review*, 1979.

———, 'Positive Research in Accounting' in R. D. Nair and T. H. Williams (eds), Perspectives on Research, University of Wisconsin, 1980.

ABACUS, Vol. 24, No. 1, 1988

D. R. GWILLIAM

Apportionment in Actions Against Auditors

Auditors are faced with an increasingly litigious environment. There are several options available to them. One is to seek apportionment with either clients or third parties by the application of the tenets of contributory negligence. Applications of this concept of contributory negligence in U.K. and British Commonwealth cases involving auditors are examined in this paper. Finally, there is a discussion of possible future developments of this branch of law as it affects the role and responsibilities of auditors.

Key words: Auditing; Contributory negligence; Liability.

Auditors today are confronted with increasing pressures in terms of litigation directed against them both by their clients and by third parties with whom the auditors have no contractual relationship. Auditors and their representative professional bodies frequently argue that the courts are placing an unfair burden upon auditors by holding them responsible not only for client losses which are more appropriately the responsibility of the management of that client, but also for the protection of third parties who have failed to take appropriate steps to protect themselves. One means whereby auditors might attempt to alleviate this burden is to seek apportionment with either clients or third parties by the application of the tenets of contributory negligence as laid down in the U.K. in the Law Reform (Contributory Negligence) Act 1945 and in the British Commonwealth in a number of identical or similar statutes.[1] This article looks at the manner in which courts in the U.K. and the British Commonwealth have applied the concept of contributory negligence in cases involving auditors.

D. R. GWILLIAM is a Lecturer in Accounting, UCW Aberystwyth, Wales.

[1] These statutes include in Australia: Law Reform (Miscellaneous Provisions) Act 1965 (N.S.W.); Wrongs Act 1958 (Vic); Law Reform (Tortfeasors' Contribution, Contributory Negligence and Division of Chattels) Act 1952 (Qld); Wrongs Act 1936 (S.A.); Law Reform (Contributory Negligence and Tortfeasors' Contribution) Act 1947 (W.A.); Tortfeasors and Contributory Negligence Act 1954 (Tas); Law Reform (Miscellaneous Provisions) Ordinance 1955 (A.C.T.); Law Reform (Miscellaneous Provisions) Act 1980 (N.T.); in New Zealand: Contributory Negligence Act 1947, in Canada: Alberta Contributory Negligence Act RSA 1970; British Columbia Negligence Act RSBC 1979; Manitoba Tortfeasors and Contributory Negligence Acts RSM 1970; New Brunswick Contributory Negligence Act RSNB 1973; Newfoundland Contributory Negligence Act RSN 1970; Nova Scotia Contributory Negligence Act RSNS 1967; Ontario Negligence Act RSO 1970; Prince Edward Island Contributory Negligence Act RSPEI 1974; Saskatchewan Contributory Negligence Ordinance ROYT 1971. (Although beyond the scope of this article, the apportionment of damages in accordance with the proportion of fault is now accepted in all but a handful of U.S. states.)

Against this background, and in the light of wider social and economic considerations, the article proceeds to discuss possible future developments of this branch of law as it affects the role and responsibilities of auditors.

CONTRIBUTORY NEGLIGENCE AND THE AUDITOR

Actions brought by clients against their auditors are usually framed in contract. To establish a defence of contributory negligence it is necessary for the auditor to demonstrate that the client has been negligent in the conduct of its own affairs and that this negligence has been a direct cause of the loss suffered by the client. In the great majority of audits the contractual relationship is with an artificial person, typically a company. In such circumstances, in order to make a defence of contributory negligence operational, the auditor has sought to show that the directors (or on occasion employees) of the company have failed to exercise reasonable care in the performance of their duties, for example in failing to institute or maintain adequate systems of internal control, and that this lack of care has been a direct cause of the loss. Third party actions against auditors are brought in tort and here the auditor has attempted to demonstrate that the negligence of the third party was a direct cause of its loss and that responsibility for that loss should be apportioned appropriately.

CONTRIBUTORY NEGLIGENCE IN CONTRACT

In the U.K. before 1945 a plaintiff's action in tort was barred if his own negligent conduct was a joint cause of the initial damage. The Law Reform (Contributory Negligence) Act 1945 was passed so as to ensure that parties which suffered loss as a result of a course of events in which they were partially at fault could in fact recover a proportion of damages from the party with the greater degree of fault. Whether the 1945 Act also applies to actions in contract, and in particular to those where the standard of contractual duty is one of reasonable care and skill, has itself been the subject of debate among both legal commentators[2] and the judiciary. This controversy has been added to by the apparent reluctance of higher courts to resolve the issue. In *De Meza and Stuart* v. *Apple, Van Straten, Shena and Stone*[3] (an action brought against an auditing firm although not directly related to an audit opinion as such) at first instance Brabin J held that the Act was applicable and apportioned the loss accordingly. On appeal[4] neither party wished to disturb this finding. In these circumstances, all three Court of Appeal judges specifically declined to commit themselves on the issue.[5]

More recent decisions (outside the field of auditing) show that this area of the law is still unsettled. In *A. B. Marintrans* v. *Comet Shipping Co. Ltd*[6] Neill LJ reviewed the construction of the 1945 Act[7] and held that it did not apply to contract even where contractual and tortious duties were similar. Neill LJ recognized that this might be seen as giving rise to anomalies and inequity but he considered that this was a matter properly righted by legislative reform rather than by a judge at first instance placing a strained construction on a statute.

---

[2] See, for example, Taggart (1977), Swanton (1981).

[3] [1974] 1 Lloyd's Rep 508.

[4] [1975] 1 Lloyd's Rep 498.

[5] For example, Roskill LJ referred to the question in the following terms: (ibid., at 509): 'This if I may be permitted to say so, has been a controversial point certainly for as long as I can remember since 1945. It has to my knowledge been argued more than once in this Court, though never decided . . . I wish to make it entirely plain that for myself I am expressing no view whatever whether the learned Judge's conclusion was right or wrong.'

In *Forsikringsahtieselskapet Vesta* v. *Butcher*[8] Hobhouse J took a different view, distinguishing between three categories of contractual claims:

1. Those where liability arises from a contractual provision which does not depend on negligence on the part of the defendant;
2. Those where the liability arises from a contractual obligation expressed in terms of a duty of care but there is no common law duty of care which exists independently of contract;
3. Those where the contractual liability is the same as that in tort irrespective of the existence of the contract.[9]

Hobhouse J considered that in many instances of category 3 cases the applicability of contributory negligence was so obvious that it passed without comment. An example of this was to be found in the Court of Appeal decision in *Sayers* v. *Harlow Urban District Council*[10] which Hobhouse J considered as having authority in this respect. For Hobhouse J, Brabin J's decision in *De Meza*[11] gave some authority to the view that the Act did apply to category 2 cases although that authority was not binding. (Most cases involving auditors would appear to fall into category 2 although one can envisage circumstances where category 1 or 3 would be more appropriate.) Hobhouse J considered that the *Marintrans*[12] case probably fell into category 1 and that Neill LJ was at fault in attempting to extend his decision to cover cases falling into categories 2 and 3.

Outside the U.K. there is a similar diversity of legal opinion and decision. Whereas Australasian courts have tended to take a conservative approach to this issue,[13] Canadian courts have shown a greater willingness to allow apportionment in contractual actions where such apportionment can be seen as fairer or more equitable.

---

[6] [1985] 3 All ER 442 (The 1945 Act was also not applied to contractual claims in two other recent English decisions: *Basildon* v. *Lesser* [1985] 1 All ER 20; *Victoria University of Manchester* v. *Wilson* (1985) 2 Con LR 45.)

[7] Ibid., at 446.

[8] [1986] 2 All ER 488.

[9] Ibid., at 508.

[10] [1958] 2 All ER 342; [1958] 1 WLR 623.

[11] [1974] 1 Lloyd's Rep 508.

[12] [1975] 1 Lloyd's Rep 498.

[13] As, for example, in Australia in *Harper* v. *Ashton's Circus Pty. Ltd* [1972] 2 NSWLR 395, *Read* v. *Nerey Nominees Pty. Ltd* [1979] VR 47 (but contrast *Smith* v. *Buckley* [1965] Tas SR 210). In *Meddick* v. *Cutten and Harvey* (1983) 36 SASR 542, at first instance White J took the view that contributory negligence was available as a plea where the defendants were liable in both contract and tort, on appeal the Full Court was not called upon to decide this issue and did not in fact discuss it. In New Zealand in *Rowe* v. *Turner Hopkins and Partners* [1980] 2 NZLR 550 at first instance Prichard J held that apportionment was not possible in a contractual action. The *Rowe* case went to appeal ([1982] 1 NZLR 178), but the Court of Appeal was not required to decide on the particular issue of the applicability of contributory negligence to contractual actions and declined to do so.

One of the clearest statements of this approach was that of the New Brunswick Court of Appeal in the *Doiron*[14] case where, following an extensive review of both British Commonwealth cases and the academic literature, the court concluded that the application of apportionment in contract was an appropriate development of the common law. The underlying rationale for this approach was clearly articulated by La Forest JA who, giving the judgment of the court, stated:

> Contribution is now consistent with prevailing theories of both the law and the market place. And it meets our sense of fairness. In many situations, the fairest approach is to apply the now ordinary rules of contributory negligence.[15]

AUDITING ACTIONS BEFORE APPORTIONMENT LEGISLATION

Before the introduction of apportionment legislation the courts generally took the view that the action or inaction of the directors of a company was not directly relevant to the question of whether a case brought against the auditors should succeed.[16] In *Leeds Estate Building and Investment Co.* v. *Shepherd*[17] the auditor was held liable for losses notwithstanding the breaches of duty proved against the directors and the manager, without which the losses would not have occurred. In *London and General Bank*[18] the failure by the directors to pass on to the shareholders the concerns of the auditors as to asset valuations and the propriety of payment of a dividend did not prevent a successful action being brought against the auditors for their failure to qualify the audit report appropriately. In *London Oil Storage Co.* v. *Seear Hasluck and Co.*[19] Lord Alverstone stated: 'I entirely agree with the view of the law . . . that the auditor cannot shelter himself for any breach of duty under the neglect of the directors'.[20]

In the later Canadian case *McBride's Ltd.* v. *Rooke & Thomas*[21] Martin CJS similarly expressed the prevailing legal view:

> Reference was made on the argument to acts of negligence on the part of plaintiff's officers and it was argued that any damages suffered were the result of this negligence . . . . I will only say that whatever may have been the negligence of the plaintiff's officers it could not relieve the defendants from the responsibilities which they undertook in their contract with the plaintiff.[22]

Although the basic pattern is clear there were exceptions; for example, in *S. P. Catterson*[23] in the U.K. and in *International Laboratories Ltd* v. *Dewar*[24] in Canada, the failings of management appear to have influenced the decision of the courts that the auditors were not negligent in failing to discover employee frauds.[25] Furthermore, on more than one occasion in cases heard before a jury the actions of the plaintiff clearly influenced the computation of damages.[26] In *London Oil Storage*,[27] although the special jury did find the auditor to have been negligent they awarded effectively nominal damages of 5 guineas adding the rider that, in their opinion, the directors had been grossly negligent.[28]

---

[14] *Doiron* v. *Caisse Populaire D'Inkerman Ltée* (1985) 17 DLR (4th) 660.

[15] Ibid., at 679.

[16] Such cases were all essentially contractual in nature as, before the *Hedley Byrne* [1964] AC 465 decision, third-party actions were effectively barred.

[17] [1887] 36 ChD 787.

[18] [1895] 2 Ch 673.

[19] (1904) 31 Acct LR 1 (more conveniently reported in Dickerson, 1966, p. 371).

[20] Dickerson, p. 372.

[21] [1942] 3 DLR 81.

[22] Ibid., at 94.

[23] *In re S. P. Catterson & Sons Ltd* (1937) 81 Acct LR 62 (more conveniently reported in Dickerson, 1966, p. 151). Here the judge stated (Dickerson, p 152): 'the first fact which seems often to have been lost sight of is that the primary responsibility for the accounts of a company is with those who are in control of the company, that is to say, the directors'.

[24] [1933] 3 DLR 665.

In Australia an example of apparent apportionment in an action brought by a municipality against its auditors is to be found in *Tumbarumba Shire Council* v. *S.*[29] Here an award of £100 was made, as against a claim of £600, with the jury expressing the opinion that the council was a good deal to blame for the unfortunate state of affairs—a view with which the trial judge seemed to concur.

CONTRACTUAL ACTIONS AFTER THE INTRODUCTION OF APPORTIONMENT LEGISLATION

Subsequent to the apportionment legislation, contributory negligence on behalf of the plaintiff has been argued in a number of reported cases involving contractual actions against auditors in Australia, Canada, and New Zealand. This section of the article seeks to highlight those factors which the courts have considered important in determining whether to allow apportionment. The cases are reviewed in country groupings which, in the order taken, correspond, with two exceptions, to their chronological ordering.

New Zealand cases

In *New Plymouth Borough* v. *R.*[30] an action was brought by a municipality against its auditors (also public sector employees) in an attempt to recover losses caused by the defalcations of the cashier of the municipality. As part of their defence the auditors argued that the municipality had contributed to its losses both because another servant of the municipality was aware of the defalcations and helped to cover them up and, perhaps more pertinently, because the betting propensities of the cashier had been brought to the attention of the Treasurer of the municipality at a date well in advance of the detection of the defalcations. Stanton J maintained the view that, even if there was negligence on behalf of the officers or employees of the plaintiff, this did not in itself provide any defence for the auditors:

---

[25] For example, in *International Laboratories*, Trueman JA stated (ibid., at 696): 'There is something more to be said. The plaintiff was utterly negligent in its petty cash system, the responsibility for which it seeks to put upon the defendants', and Richards JA concluded his judgment with the observation: (ibid., at 709): 'On the whole the management of the plaintiff company in carrying out their duties were in a better position to discover the frauds than were the defendants, who in my opinion, were not guilty of negligence.'

[26] The willingness of juries to apportion fault in nineteenth-century tort actions, even when clearly instructed as to the nature of the then law in respect to contributory negligence, is well documented; for example, in *Raisin* v. *Mitchell* (1839) 9 C&P 613, 173 Eng Rep 979 the jury awarded damages of £250 as compared with £500 claimed. On protest from the plaintiff Tindal CJ ascertained from the foreman of the jury that the jury considered there to have been 'faults on both sides'. Counsel for the defendant then submitted that in this case the defendant was entitled to complete relief but Tindal CJ declined to disturb the verdict.

[27] (1904) 31 Acct LR 1 (reported in Dickerson, 1966, p. 371).

[28] Again Lord Alverstone CJ did not seek to disturb the decision of the jury although it may be conjectured that he did not entirely approve. With reference to the question of costs he stated (Dickerson, p. 382): 'I think there was a substantial question to be fought here, and that the finding of the jury that the directors have been guilty of gross negligence, though a perfectly proper finding in order to show why they came to the conclusion that it was not the breach of duty which they had previously found that caused this large loss, ought not to affect the question of costs'.

[29] [1916] 3 LGR (N.S.W.) 162.

[30] [1951] NZLR 49.

> Nor is it necessary to consider whether the Contributory Negligence Act, 1947 applies, as I have held that the loss sustained is to be attributed solely to the negligence of the respondent, and that, if there was negligence on the part of the Council, it did not afford any answer to the Council's claim.[31]

In *Nelson Guarantee Corporation* v. *Hodgson*[32] the company sought to recover from its auditor losses occasioned by the defalcations of the company secretary. This was an unusual case in that the period in which the losses took place was never audited in the conventional sense of the term but it was alleged that because the accounts and audit were so long delayed the auditors of the company should have taken some interim measures, specifically in relation to cash, within the normal scope of their duties. As part of their defence the auditors alleged failure on the part of the company to keep its books of accounts regularly and properly written up and to make those books available to them for the purposes of audit. The auditors also alleged that the chairman of the company failed to take those steps which a reasonably careful chairman of directors and manager would have taken in protection of the interests of his company in the circumstances which arose.

The action failed as McCarthy J held that there had been no negligence on behalf of the auditors. However, should he have held otherwise, he would have apportioned the losses on the grounds of the negligence of the officers of the company. He stated:

> In my view, therefore, the action fails. In case the matter should go further, it is perhaps desirable that I should add, very briefly, that I would have held, had it been necessary, that the losses were contributed to by the negligence of the executive of the company, details of which I refrain from enumerating. In my view, having regard to the form of the pleadings, this claim is brought in tort . . . and if the Contributory Negligence Act 1947 can be invoked, as I think it can, then I consider that an appropriate percentage to allow in respect of the negligence of the company itself would be fifty per cent.[33]

Australian Cases

In *Pacific Acceptance* v. *Forsyth*[34] while the defendants did not specifically argue contributory negligence as a defence (it is unclear whether because they did not think it could be sustained in contract or because they accepted that it was not appropriate to auditing situations), they did nevertheless frequently draw attention to supposed shortcomings in the activities of management and sought to make these an issue in the case. Moffitt J noted this stating:

> Counsel for the defendants within the framework of the law and in the absence of any available defence

---

[31] Ibid., at 66.
[32] [1958] NZLR 609.
[33] Ibid., at 619.
[34] (1970) 92 WN (N.S.W.) 29.

> of contributory negligence[35] sought to make the knowledge and conduct of management relevant on some basis. On this somewhat elusive task much time and effort was devoted and much nimbleness displayed . . .
>
> In reality it was an attempt to raise contributory negligence whilst conceding that it was not open.[36]

The defendants also sought to make the negligence of the directors and their failure to keep the auditors fully informed a justification for excusing the auditors from liability for their negligence under s. 365 of the Companies Act 1936 (N.S.W.)—equivalent to the present s. 727 Companies Act 1985 (U.K.). Moffitt J outlined the defence contention accordingly:

> If . . . provision should have been made . . . then the position was that the board knowing the position, not making the provision and concealing the position from the auditors, it is unjust that the auditors should bear responsibility for the loss or the whole of the loss to the company. It was argued that the board was the company and not its mere agent or delegate.[37]

However, he had little sympathy for this line of argument:

> Having in mind the function of the auditor and his relation to the shareholders, and in particular his duty to them in relation to the directors, I do not find merit in a submission which in effect is that although the defendants were negligent they should be excused because the directors also were negligent . . . 'If there is a complaint that other officers of the company also failed in their duty and contributed thereby to the loss, then the proper course is to take such action, if any, as in the circumstances is open to the auditor, for contribution from the officers at fault so that the company's loss can be shared between those proved at fault after precise allegations and proper investigation, rather than being cut down or excused to the detriment of the company because others as well as the auditor were at fault.[38]

In *Simonius Vischer and Co.* v. *Holt and Thompson*[39] the defence argued that the plaintiffs' (alleged) knowledge of unauthorized trading by its agents, together with the plaintiffs' failure to take effective action to prevent this unauthorized trading or even to warn the auditors of its existence, constituted contributory negligence. At first instance Sheppard J rejected this argument stating: 'the defendants are unable, this being an action for breach of contract, to rely on this defence before me'.[40]

On appeal, the issue was pressed more strongly[41] and was considered at some length by Samuels JA who was not, however, prepared to express a definite opinion. He stated:

---

[35] Moffitt J had earlier referred to the failure to plead a defence of contributory negligence in the following terms (ibid., at 123): 'It has not been asserted at any time that the defendants could raise any defence of contributory negligence and the defendants acknowledge that no such claim is made or presumably could be made.'

[36] Ibid., at 125.

[37] Ibid., at 123.

[38] Ibid., at 124.

[39] [1979] 2 NSWLR 322.

[40] Quoted by Samuels JA, Ibid., at 349.

[41] On grounds described by Samuel JA in the following terms (ibid., at 350): 'Before us, however, the argument was somewhat enlarged. It was submitted, although not with great conviction, that, if the action were to be properly regarded as one for breach of contract, the defence of contributory negligence was still available. But counsel relied principally upon the contention that the current of recent authority tended to establish . . . that an action against auditors for want of professional care in the performance of their professional duties sounded properly in tort . . . Hence the plaintiffs, by deliberately choosing to pursue one cause of action rather than the other, could not deprive the defendants of a defence which was an answer to the substance of the plaintiffs' claim, however it had been pleaded.'

> Because of the view I take of the facts, it would be inappropriate to examine the question further, and I express no concluded view upon it. It would be sufficient to say . . . that the point remains open and arguable.[42]

Reynolds JA had no doubt that the defence of contributory negligence was not available.[43] Moffitt P left open the question of whether the defence was generally available where contractual duties were similar to duties in tort, but suggested that the defence would be very hard to sustain in an action brought against an auditor:

> I prefer to express no opinion upon the questions debated before us at length . . . in relation to whether a cause of action in tort lies for professional negligence, whether any such action should be treated as an action in tort and, accordingly, whether the defence of contributory negligence is available. There is, however, one comment that I do make. Where the action for professional negligence is against an auditor, it is difficult to see how a finding of contributory negligence, according to the usual concepts, could be made. If, as where the audit is of a public company, the audit contract or the undertaking of an audit is found to impose a duty to be exercised so as to safeguard the interests of the shareholders, it is difficult to see how the conduct of any servant or director could constitute the relevant negligence, so as to defeat the claim against the auditor, whose duty is to check the conduct of such persons and, where appropriate, report it to the shareholders.[44]

In more recent Australian actions brought in contract, for example, *Hardie (Qld) Employees' Credit Union* v. *Hall Chadwick and Co.*[45] (defalcations by a cashier) and *Cambridge Credit Corp. Ltd* v. *Hutcheson & Ors*[46] (conduct of a negligent audit and failure to report breaches of liquidity and gearing ratios as prescribed by the debenture trust deed), the defence of contributory negligence does not appear to have been raised. On the bases of the facts in the cases, as reported, this is *a priori* rather surprising and suggests that the *Pacific Acceptance*[47] and *Simonius Vischer*[48] judgments have discouraged Australian defendants from pursuing this line of defence.

Confirmation of the difficulties facing auditors seeking to obtain apportionment in Australia may be seen in the recent case *W. A. Chip & Pulp Co. Pty Ltd* v. *Arthur Young & Co.*[49] Here, over a period of time, the financial manager of the plaintiff company became substantially indebted to the company. These debts were both unauthorized and, in the outcome, irrecoverable. An action was brought against the company's auditors alleging that they had been negligent in failing to communicate their concerns as to the size of, and apparent lack of authorization for, the financial manager's personal account to the general manager of the company. As part of a plea of contributory negligence the auditors claimed both that the company accountant (a subordinate of the financial manager) should have drawn the attention of the general manager to the outstanding account and also that the general manager had failed to exercise appropriate supervision and control over employees' personal accounts.

---

[42] Ibid., at 355.

[43] He stated (ibid., at 340): 'I do not find it necessary to express an opinion upon the question of contributory negligence, except that, in my view, it was not available to defeat this claim for breach of contract in fact or in law'.

[44] Ibid., at 329.

[45] [1980] Qd R 362. The apparent absence of any discussion of contributory negligence in this case is perhaps surprising in that Douglas J accepted the argument of the plaintiffs that a right of action lay in tort as well as in contract and awarded damages on that basis.

[46] (1983) 8 ACLR 123, 513, 526; (1985) 9 ACLR 545; (1987) 5 ACLC 587.

[47] (1970) 92 WN (N.S.W.) 29.

[48] [1979] 2 NSWLR 322.

[49] (1987) 5 ACLC 1002.

These arguments found little favour with Pidgeon J on either a factual or a legal basis. Pidgeon J distinguished the Canadian decision in *Revelstoke*[50] on the ground that in *Revelstoke* an employee had failed to carry out a specific duty imposed on him by the company whereas in the present case the company accountant had no clear duty to report a possible breach of duty by his superior to a higher level of management. Even if such a duty was assumed, Pidgeon J considered (by reference to Moffitt P's views in *Simonius Vischer*[51]) that there would be no basis in law to justify seeing such a breach of duty as contributory negligence attributable to the company.[52] While Pidgeon J did not dismiss so emphatically the possibility of negligence by the general manager constituting contributory negligence by the company, neither did he give support to this possibility. As, on the facts, he did not find the general manager to have been negligent it was not necessary to discuss the matter further.

Canadian Cases

In *West Coast Finance* v. *Gunderson, Stokes, Walton,*[53] a case heard in British Columbia, at first instance the judge was prepared to allow apportionment in a contractual action (for discussion of the concurrent third party action see p. 49). Here the plaintiffs alleged that because of the failure of the auditors to draw their attention to the inadequate debt provisions in their balance sheet they maintained a trading relationship with a number of companies (car dealers) and eventually lost heavily thereby. The mainspring of the contributory negligence argument was that the trading relationship depended on the involvement of one person (Rose), who was known to the board of West Coast, in the management of these companies. This person had in fact resigned from these companies and informed West Coast of his resignation, but, because of the inadequacy of the administrative procedures, this resignation was never brought to the attention of the West Coast board and the trading relationship was not terminated.

MacDonald J had little doubt that the relevant apportionment legislation was applicable, citing as authority a previous first instance decision in British Columbia.[54]

Furthermore, MacDonald J considered that not only had West Coast been negligent but that that negligence was a factor which contributed to the loss which it was seeking to recover from the auditors:

> Now it is not enough that West Coast simply failed—if such is the case—to take sufficient care in its own interest. Contributory negligence can only be found if that lack of care contributed to the loss with which it charges the defendant. I think that the poor administrative procedures of West Coast were probably the reason that notice of the sell-out of Rose's interest was never given to the directors. If they had been notified they probably would have ended at once the relationship with the three dealerships. If not that, close attention would have been given to contracts coming from them, and the losses reduced. Contributory negligence is established. In my opinion it is not possible to establish different degrees of fault, and therefore liability is apportioned equally.[55]

---

[50] [1984] 2 WWR 297.

[51] See p. 49 above.

[52] [1984] 2 WWR 297.

[53] (1974) 44 DLR (3rd) 232; (1975) 56 DLR (3rd) 460.

[54] *Emil Anderson Construction Co. Ltd et al.* v. *Kaiser Coal Ltd et al.*, 8 September, 1972 (unreported).

[55] (1974) 44 DLR (3rd) 232, at 235.

On appeal a majority of the British Columbia Court of Appeal took the view that the actions of the plaintiff were not materially affected by the negligence of the auditor and therefore they declined to make the auditor responsible for losses caused by these actions (or, more accurately, inaction). In these circumstances it was not necessary for the majority to consider the issue of contributory negligence. As McFarlane JA noted: 'The very interesting problem of contributory negligence, therefore, becomes academic and I resist the temptation to discuss it'.[56]

Seaton JA dissented as he believed the actions of the company were affected by the negligence of the auditors. He also supported the findings of the trial judge in respect to apportionment, stating:

> I am obliged to deal with the question of the appellants' contributory negligence . . . In this case, had the directors known that Mr Rose was no longer involved in the three dealerships, they would have ceased doing business with those dealerships and thus avoided the substantial losses that are claimed here. The mistaken belief that Mr Rose was involved was caused by wholly inadequate administrative procedures. The directors ought to have discovered that the key element, Rose's involvement, no longer existed. Their failure was a direct cause of the loss. It had nothing to do with the auditors.[57]

Apportionment has been applied in two comparatively recent Canadian auditing cases. In *H. E. Kane* v. *Coopers & Lybrand*[58] a family firm sought to recover from its auditors losses occasioned by the default of a customer whose true level of indebtedness to the firm had been deliberately concealed from the founder and president of the firm by one of his sons. Here, at first instance, Hoyt J outlined the defence argument as follows:

> The defendants additionally say that should they be found liable Harold Kane's complete lack of supervision of the travel division and Charles Kane's wilful concealment of the unreported tickets amount to conduct by the company which should reduce any award. In the event it was found that contributory negligence was not available then the defendants have counter claimed against Harold Kane and commenced third party proceedings against Charles Kane.[59]

Hoyt J discussed the applicability of Moffitt J's contention that the most suitable cause of action was to allow these other claims to proceed.[60] He stated (as reported):

> While these remarks may be appropriate in situations involving public companies and or in the case of third party actions such as investors or purchasers who rely on these statements I must think that contributory negligence is appropriate in circumstances like this. Here the company's conduct shouts out and one would recoil at the thought that, despite that conduct, it would be entitled to full recovery.
>
> Although the business was incorporated it was run almost exclusively by Harold Kane who acted as president, general manager and bookkeeper. At that time his son Charles Kane had full responsibility, apart from accounting functions, for the travel agency. I prefer to meet the problem head-on and dispose of the matter by contributory negligence rather than by using the counterclaim as suggested by Moffitt J, in *Pacific Acceptance.*[61]

Accordingly the assessed damages were reduced by 50 per cent. Hoyt J gave only passing consideration to the question of whether contribution was available in contractual actions, stating:

---

[56] (1975) 56 DLR (3rd) 460, at 464.
[57] Ibid., at 467.
[58] (1983) 116 APR 374; (1985) 17 DLR (4th) 695.
[59] (1983) 116 APR 374, at 389.
[60] see p. 43 above.
[61] (1983) 116 APR 374, at 391.

> Here it was the negligent performance of the contract which gave rise to action. In my view, as the consequences flowing from the former distinction between actions founded in tort or contract is becoming blurred, the award must be reduced because of the company's conduct.[62]

On appeal the court examined this issue more closely, referring in particular to its own contemporaneous judgement in *Doiron*.[63] Applying the precepts discussed in this case to the particular circumstances of *H. E. Kane*, the court upheld the decision of Hoyt J. Giving the judgment of the court, Stratton JA stated:

> In the instant case, I am satisfied that the duty of Coopers & Lybrand arose from their contract of engagement. Whether one accepts the argument that at common law damages could be apportioned in actions in contract as well as in actions of tort and that the Contributory Negligence Act, R.S.N.B. 1973, c. C-19, should be applied by analogy, or adopts the theory of the reasonable expectations of the parties, or the notion of reliance that was either qualified or unreasonable, or simply that in fairness and to do justice the damages ought to be apportioned, I do not think that in the circumstances of this case the trial judge erred in concluding that the actions of the company president, Harold Kane, and of Charles Kane, its employee, contributed to the company's loss. Nor am I able to say that the apportionment of the degrees of fault of each party is wrong.[64]

In *Revelstoke Credit Union* v. *Miller*[65] an action was brought by a credit union against their auditors in an attempt to recover losses consequent upon the auditor's failure to detect loans made without proper authorization by the manager of the credit union (a Mr MacLean). Third party claims were made by the auditor against both the directors of the credit union and also against an employee of the credit union who was aware that certain of the loans were overdue and failed to report the fact to the directors (as his duties required him to do). McEachern CJSC found the auditors to have been negligent but reduced the damages by 15 per cent in consideration of the contributory negligence of the employee. He did not find the directors to have been negligent, arguing that they were entitled to entrust the day-to-day running of the business to a manager and to rely upon the auditors to detect irregularities. He stated:

> With regard to systems, I think the directors who trusted Mr MacLean cannot be faulted because they arranged for a proper audit, and they were entitled to assume that that audit and the other inspections furnished under the Credit Unions Act would protect the credit union from a failure of systems such as a lack of proper checks on the disbursement of funds.[66]

McEachern CJSC considered that unless an exception to *stare decisis* could be found he was bound by the earlier decision in *West Coast Finance*[67] as regards the applicability of apportionment to contractual actions. McEachern CJSC discussed the question of whether the judgments in *Pacific Acceptance*[68] and *Simonius Vischer*[69] could constitute such an exception to *stare decisis* but concluded that they did not for the following three reasons:

---

[62] Ibid., at 392.

[63] (1985) 17 DLR (4th) 660.

[64] (1985) 17 DLR (4th) 695, at 708.

[65] [1984] 2 WWR 297.

[66] Ibid., at 325.

[67] (1974) 44 DLR (3rd) 232; (1975) 56 DLR (3rd) 460 (see p. 45).

[68] (1970) 92 WN (N.S.W.) 29.

[69] [1979] 2 NSWLR 322.

> First it does not appear that an apportionment of fault was considered in the *Pacific Acceptance* case. Secondly, it appears that the directors in the second case were acting dishonestly, in breach of their authority, and their misconduct should not be properly attributed to the owner any more than the misconduct of Mr MacLean should be attributed to the plaintiff in this case. Thirdly, the judgment of MacDonald J in the *West Coast* case is consonant with the provisions of the Negligence Act [of British Columbia] . . . which . . . commands me to apportion damage or loss caused by the fault of two or more persons.[70]

Because of the finding of contributory negligence, the auditor's claim against the employee was dismissed:

> It is clear that there should be no duplication in the benefit obtained by the defendants as a result of the finding of negligence against Mr. Rafuse. The plaintiff's recovery is reduced by that amount so the third party proceedings must be dismissed.[71]

CONTRIBUTORY NEGLIGENCE BY THIRD PARTIES BRINGING ACTIONS IN TORT

The statutory apportionment provisions were designed to be applicable to actions brought by third parties in tort and although it was argued in *JEB Fasteners Ltd* v. *Marks Bloom & Co.*[72] that they did not apply to actions for negligent misrepresentation, Woolf J dismissed this argument stating:

> It was argued on behalf of the defendants in this case that, if contrary to their primary contention they were under any liability to the plaintiffs, then the plaintiffs were guilty of contributory negligence. The plaintiffs contended that the Law Reform (Contributory Negligence) Act 1945 did not apply to actions founded on an allegation of negligent misrepresentation . . .
>
> The words of S1(1) of that Act are in very wide terms and I can see no reason why these terms are not sufficiently wide to cover a case involving negligent misrepresentation.[73]

However, in very few of the reported cases has contributory negligence in itself been a mainspring of the auditor's defence. This may be due in part to the fact that auditors have usually been able to defeat third party actions in their entirety (very few third party actions against audit firms have been successful). It may also be because of the difficulty of arguing that a third party was negligent in placing reliance on an audit report in a situation where it was reasonably foreseeable that they would so place reliance. Woolf J referred to this latter issue in the following terms:

> I do, however, recognise that it may well be that in the case of negligent misrepresentation the scope for contributory negligence is limited since an auditor will only be liable if he should foresee that someone might rely on his accounts and, as I have sought to indicate, this involves it being reasonable for the person concerned to rely on the accounts. If it is reasonable to rely on the accounts, it is difficult to envisage circumstances where as a matter of fact it would be negligent to do so without taking further steps to protect yourself from the consequence of relying on the auditor's certificate.[74]

---

[70] [1984] 2 WWR 297, at 331.

[71] Ibid., at 332.

[72] [1981] 3 All ER 289; [1983] 1 All ER 583.

[73] [1981] 3 All ER 289, at 297.

[74] Ibid., at 297.

THIRD PARTY ACTIONS SUBSEQUENT TO THE APPORTIONMENT LEGISLATION

In *Candler* v. *Crane, Christmas and Co.*[75] the question at issue was whether the auditor could owe a duty of care to any party outside contract and contributory negligence as such was not considered. Nor was it referred to directly in *Diamond Manufacturing Co. Ltd* v. *Hamilton,*[76] *Haig* v. *Bamford, Hagen, Wicken and Gibson,*[77] *West Coast Finance* v. *Gunderson, Stokes, Walton*[78] (the third party action), *Toromont,*[79] or *Scott Group Ltd* v. *McFarlane.*[80] In these cases (decided at various levels in either Canada or New Zealand) the question of reliance was decided in its entirety and apportionment was not discussed although the circumstances of each case saw differing levels of further enquiry and attempts at self-protection.

In *Haig* v. *Bamford* where, on appeal to the Supreme Court of Canada, the plaintiff was successful in obtaining damages from the auditor, evidence was given that Haig had shown the audited financial statements to his accountant and his banker and had also visited the plant and inspected the equipment and inventory of the business in which he proposed to invest, although he had not looked at the underlying accounting records.

In *Toromont* the lack of inquiry made by the plaintiff counted against them at first instance, Holland J noting:

> The Toromont board and executive committee were eager to complete the purchase. They made little investigation and were worried about another purchaser lurking in the background. I really do not think that I can say that the purchase would not have been completed, or that the loss flowing from the negligence of the defendants is, in this case, the difference between the purchase price and the true value of the shares.[81]

(On appeal[82] this decision was overturned but only to the extent of allowing Toromont to recover the costs of their post purchase audit and investigation and not the full extent of their loss.)

While contributory negligence was at issue in the contractual *West Coast Finance*[83] action, the defence was not raised in respect to the third party action (which was partly successful at first instance but unanimously overturned on appeal on the grounds that the third party had suffered no demonstrable loss). The auditors were apparently responsible for preparing and auditing the financial statements and the third party, who was a director and the president of West Coast Finance, had extended his personal interest in the business on the basis of the audited financial statements. In *Scott Group Ltd* v. *McFarlane* the investigation by the third party was limited to examination of the audited financial statements and other publicly filed information. Apart from this, direct enquiries appear to have been very limited and there is no mention of guarantees from the directors of the company taken over. Again in this case, which failed only on the question of the quantum of damages, if any, contributory negligence was not raised as a defence.

---

[75] [1951] 2 KB 164.
[76] [1969] NZLR 609.
[77] [1976] 3 WWR 331.
[78] (1974) 44 DLR (3rd) 232; (1975) 56 DLR (3rd) 460.
[79] (1976) 62 DLR (3rd) 225; (1977) 73 DLR (3rd) 123.
[80] [1978] 1 NZLR 553.
[81] (1976) 62 DLR (3rd) 225, at 254.
[82] (1977) 73 DLR (3rd) 123.
[83] See p. 45 above.

In *JEB Fasteners*[84] the question of contributory negligence was considered in some detail. JEB Fasteners took over BG Fasteners, the takeover was not a success and JEB Fasteners brought an action against the auditors of BG Fasteners alleging that in deciding to take over BG Fasteners they had placed reliance upon the financial statements of BG Fasteners which showed that the company was making a small profit. These statements were negligently prepared and audited, in particular stock being shown at market value rather than cost, and restatement in accordance with normal accounting principles showed that BG Fasteners had made a substantial loss in the period under consideration. The contributory negligence argument was that JEB Fasteners had been negligent in accepting the financial statement figures at face value. Woolf J's general comments on the applicability of contributory negligence to third party actions against auditors are outlined above. In the particular circumstances of the case he discussed the issue in the following terms:

> The picture which was revealed before the take-over was certainly one which in my view required the plaintiffs to try to make further inquiries if they thought it was critical that the company should be in the position which the accounts purported to indicate. There were however limited steps which they could take and ultimately the best they could do was to ask for access to more information. This was refused to the plaintiffs and so it does not seem to me that they can be held guilty of contributory negligence.[85]

Contributory negligence was also mentioned in passing in the *Twomax*[86] case although again it was not specifically raised as a defence.[87]

ECONOMIC CONSIDERATIONS AND POLICY IMPLICATIONS

A number of commentators[88] have argued that the nineteenth century development of the rule normally barring recovery in negligence where there was fault on the behalf of the plaintiff was consistent with a laissez-faire economic approach emphasising self-protection at a time when the courts were anxious to place as little restraint as possible on the developments of new technology, patterns of work and modes of enterprise. In the twentieth century the widespread acceptance of the concept of apportionment, as evidenced by its statutory adoption in so many legislatures, has been seen as a reflection of the more collective and interdependent nature of modern society, within which it may be considered either morally unacceptable or economically undesirable to place the same emphasis on self-protection as was considered appropriate in the previous century. Any shift in case law toward allowing contributory negligence as a defence to contractual actions in which the alleged breach of duty is one of failure to exercise reasonable care and skill may also be seen as part of such a general trend. Paradoxically, however, the acceptance by the courts of apportionment in such actions directed at auditors may in many instances have the effect of imposing economic penalties upon relatively blameless parties, shareholders who have, through the mechanism of payment for audit, already taken very significant steps toward self protection.

---

[84] [1981] 3 All ER 289 (see p. 48 above).

[85] Ibid., at 306.

[86] *Twomax et al.* v. *Dickson, Macfarlane and Robinson* [1983] SLT 98.

[87] Lord Stewart referred to the issue as follows (ibid., at 105): 'I now have to consider whether there are any considerations which ought to negative, or to reduce or limit the scope of the duty or the class of the person to whom it is owed or the damages to which a breach of it may give rise. I can say briefly that I can discern no such consideration. In *JEB Fasteners Ltd* mention was made of the possibility of contributory negligence on the part of the plaintiffs. In the present actions it is not pleaded that the pursuers contributed to their loss by their own negligence.'

[88] See, for example, Bohlen (1908), Malone (1946).

Should shareholders who have appointed auditors to protect their interests be held responsible for the failings of management negligently overseen by auditors? To take a simple if rather extreme example, if in a liquidation a damages award of $100 million was made against the auditors a finding of 50 per cent contributory negligence on behalf of the plaintiff would reduce by $50 million the resources potentially available to shareholders (and creditors). Although it is true that ultimately the shareholders are responsible for appointing the directors and managers of a company, as a matter of commercial reality the opportunities for shareholders to exercise control over the management of a public company are likely to be very limited.[89] It may then be argued that a defence of contributory negligence would only be properly available in circumstances where it could be shown that shareholders have knowingly elected incompetent or dishonest officers; or that shareholders were in some manner aware, or should have been aware, of the deficiencies of officers or employees. This is most likely to be the case where there is a substantial commonality between the shareholders and the officers of the company (as was the case in *H. E. Kane*).[90] Even then there is scope for dispute as to the need to protect minority shareholders not associated in managerial functions; as to whether fault corresponds to share proportions and whether other third parties, for example, creditors, with minimal influence over the actions of the company are likely to suffer loss as a result of apportionment.

In the more usual situation, at least in larger companies, where there is a substantial divorce between ownership and operational control then in cases of clear failures of duty by client officers or employees, the most appropriate course of action is likely to be that identified by Moffitt J,[91]—that is, for the defendant auditors to bring separate actions against negligent company officers or employees. This may seem a cumbersome legal process but it is difficult to see how otherwise the rights of shareholders can be protected. While the application of apportionment may have a certain attractiveness as a means for shortcircuiting the legal process, and may also be thought an equitable device in instances where the courts are uncertain either as to what the appropriate level of care to be exercised by the auditor should have been (or have doubts as to whether the losses flowed directly from the breach of duty), its use here would be based upon premises of efficiency or equity rather than application of the usual principles of contributory negligence. This may be seen clearly by the fact that where contributory negligence is at its most total, for example, where some or all the company officers have been grossly negligent, or even fraudulent, as in *Thomas Gerrard*[92] (and as alleged in *Cambridge Credit*),[93] contributory negligence as a defence has not been raised at all. While there may be intuitive appeal in relieving the auditors of some of the responsibility for defalcations on the grounds that the directors have been negligent in failing to ensure suitable systems of internal control, it is necessary to appreciate that the logical continuation of such a policy would be to wholly relieve when the directors have been wholly negligent.[94] Clearly such a development would negate one of the main purposes of having an audit and as such would be unacceptable to both shareholders and to regulatory authorities.

---

[89] In the U.S. Posner J took a different view in *Cenco* ((1982) 686 F2d 449) where in giving the judgment of the court he stated (at 455): 'Cenco's owners—the stockholders—hired managers . . . who turned out to be thoroughly corrupt . . . if the owners of the corrupt enterprise are allowed to shift the costs of its wrongdoing entirely to the auditor their incentives to hire honest managers and monitor their behavior will be reduced'.

[90] See p. 46 above.

[91] See p. 43 above.

On the other hand auditors may argue that to remove the possibility of a defence of contributory negligence, and to require them to make specific claims against negligent company officers, will be inequitable. Three possible reasons for this stand out. Firstly, to bring an independent action the auditors would need to show that the officers or employees owed them a duty of care which may not be that simple.[95] However, in the U.K. an alternative, and more straightforward procedure would be a contribution claim under the Civil Liability (Contribution) Act 1978. Second, case law suggests that the duties of individual directors are not overly onerous. While there is some evidence (e.g., as in *Dorchester Finance Co. Ltd* v. *Stebbing*[96] of higher standards than those countenanced in earlier years (e.g., as in *Re Denham & Co.*[97], *Dovey* v. *Cory*[98], *City Equitable Fire Insurance Co. Ltd*[99])). There is still a clear distinction between the standards of duty owed by directors and those owed by auditors and other professional advisers as illustrated in both *Revelstoke*[100] and in the Scottish case *Andrew Oliver* v. *Douglas*.[101] In these circumstances, many such actions may fail. Third, few directors carry high levels of personal insurance cover[102] and frequently the amounts recovered from a successful action would be very small and in consequence all but the entire amount of any award would fall at the feet of the auditors.

---

[92] [1968] Ch 455.

[93] (1983) 8 ACLR 123, 513, 526; (1985) 9 ACLR 545; (1987) 5 ACLC 587 (see p. 44 above). In some respects *Cambridge Credit* might appear a suitable case for apportionment as the company was controlled by the managing director and his family. In this context the remarks of McHugh JA in the New South Wales Court of Appeal are of interest. He stated ((1987) 5 ACLC 623): 'What makes the present claim truly remarkable is that Cambridge does not assert that it relied on the certificates of the auditors or on their failure to qualify the accounts. Through its officers and particularly the managing director, Cambridge was well aware of the facts.' However, the effective burden of any apportionment in the *Cambridge Credit* case would have fallen upon the creditors.

[94] In *Revelstoke* (see p. 47 above) McEachern CJSC sought to circumvent this argument in the employee context by arguing that whereas the actions of the manager, MacLean, were clearly outside the scope of his employment, Rafuse, who should have reported the outstanding loans to the directors, was being negligent within the scope of his employment. This, of course, is a fine distinction and one that may not stand up to close examination.

[95] Certain aspects of the relationship between officers and employees of a company and the auditors of that company are discussed in the Australian context in *Dominion Freeholders Ltd* v. *Aird* (1966) 67 SR (N.S.W.) 150 and in *Employers Corporate Investments Pty. Ltd* v. *Cameron and Ors* (1977) 3 ACLR 120.

[96] *Times*, 23 July 1977, p. 2.

[97] (1883) 25 Ch 752.

[98] [1901] AC 477.

[99] [1925] Ch 407.

[100] [1984] 2 WWR 297 (see p. 47 above).

[101] [1983] SLT 222.

In third party actions the courts have experienced great difficulty in determining those circumstances in which the auditors owe a duty of care to third parties unknown to the auditor at the time of the audit. In case law a number of seemingly arbitrary and artificial distinctions have been made in respect to the auditor's knowledge of the likelihood of takeover, the client's need for capital, the size of the potential investor, etc. Similarly, as evidenced in *JEB Fasteners*[103] and a number of other cases, the courts have followed an all-or-nothing rule as to the extent of reliance by the third party on the audited financial statements. In third party actions the arguments which suggest that apportionment is unlikely to be suitable in contractual actions against auditors have much less force. There are no parties such as shareholders with circumscribed abilities to affect the actions of what are effectively their agents. In these circumstances one possible way forward might be for the courts to recognize a rather wider potential duty of care than at present (especially in regard to publicly available audited financial statements) but, if negligence by the auditor is established, to allow more easily the auditor to raise the defence of contributory negligence. Apportionment under contributory negligence might then be applicable in those situations where an investor relies upon financial statements issued some time earlier, fails to protect himself or herself by means of appropriate further commercial inquiry, etc. This of course would still leave the courts with very substantial policy issues both as to what constitutes negligent auditing and as to what is the appropriate level of self-protection.[104] The resolution of these issues is likely to vary with the social concerns and priorities of the day and may differ from country to country.[105] Nevertheless, such an approach may be seen as more consistent and equitable from both the viewpoint of the auditor and from that of the user of financial statements who seeks to place reliance upon the auditor's report.

---

[102] There is also the possibility that courts may impose double standards in respect to reasonable care/responsibility for loss as and between situations where losses are to be spread across a number of parties and those where individuals face personal ruin. In this respect there is some U.S. evidence that higher damages are awarded when the loss is ultimately to be borne by an insurer.

[103] See p. 48 above.

[104] For more detailed discussion and analysis of the interaction between law and economics in respect to self-protection, contributory negligence and economic efficiency, see Schwartz (1978), Haddock and Curran (1985) and Rubinfield (1987).

[105] An illustration of the apparently changing views of one judge may be found in contrasting the remarks of Woolf J in *JEB Fasteners* (see p. 48 above) with this extract from his postscript to his judgment in *Lloyd Cheyham* v. *Littlejohn*, another third party case where contributory negligence as such was not raised as a defence: 'However, before I complete this judgement there are three things I wish to add . . . The second is that while Mr Anderson no doubt believed in the merits of the claim in fact he was placing a wholly unjustified responsibility upon the auditors. He failed to obtain the usual warranties or make the usual inquiries before investing in Trec and then sought to blame his loss on the failure of the auditors to provide him with the protection that he did not provide for himself. While it is right that auditors should exercise a duty of care to those who they appreciate will rely on their audited accounts this duty does not mean that a purchaser need not exercise any care to protect himself' (1985 Queens Bench unreported—see Gwilliam, 1986).

REFERENCES

Bohlen, F., 'Contributory Negligence', 21 *Harvard Law Review* 233 (1908).

Dickerson, R. W. V., *Accountants and the Law of Negligence*, CICA, 1966.

Dugdale, A., 'Contributory Negligence', *Professional Negligence*, 1, 96, 1985.

Gwilliam, D. R., 'Setting the Standards Used by the Law', *Accountancy*, 15 April 1986.

Haddock, D., and C. Curran, 'An Economic Theory of Comparative Negligence', 14 *Journal of Legal Studies* 49 (1985).

Malone, W. S., 'The Formative Era of Contributory Negligence', 41 *Illinois Law Review* 151 (1946).

Rubinfield, D. L., 'The Efficiency of Comparative Negligence', 16 *Journal of Legal Studies* 375 (1987).

Schwartz, G. T., 'Contributory and Comparative Negligence: A Reappraisal', 87 *Yale Law Journal* 697 (1978).

Swanton, J., 'Contributory Negligence as a Defence to Actions for Breach of Contract', *Australian Law Journal* 55 (1981) 278.

Taggart, M. B., 'Contributory Negligence: Is the Law of Contract Relevant?', *Auckland Law Review* 2 (1977) 140.

ABACUS, Vol. 24, No. 1, 1988

M. J. MEPHAM

The Eighteenth-Century Origins of Cost Accounting

A discussion of the important description of a manufacturer's costing and management accounting system which an eighteenth-century Scottish academic, Robert Hamilton (1743-1829), gives in his book, *An Introduction to Merchandize* (1777/9). Hamilton's system is considered in the context of the economic developments which were taking place, contemporary practice and the works of other writers.

Key words: Cost accounting; Income; History; Opportunity cost.

COST ACCOUNTING WRITERS OF THE EIGHTEENTH CENTURY

The British Industrial Revolution, which began in the eighteenth century, gave an impetus to the development of improved management information systems (Scott, 1905; Roll, 1930; Rimmer, 1960; Pollard, 1965; Kendrick, 1970; Stone, 1973; Marshall, 1980) but there was little supporting writing on industrial cost accounting, not only in that century, but also for most of the next (Edwards, 1937a). Although it seems that cost accounting practice was in advance of the textbook expositions, the position must not be overstated. Some manufacturers had developed accounting systems which included some form of cost accounting but 'the development of accounting as a tool of industrial management in this period, was patchy and uneven' (Pollard, 1965, p. 215) and industrialists often experienced difficulty in calculating the costs and profitability of different branches of trade.

The eighteenth-century textbook expositions did display an increasing emphasis on the managerial uses of accounting for both merchants and estate owners but only three accounting authors discussed industrial costing and after these nothing further of importance appeared (in English) until the end of the next century. The three writers were James Dodson (1750), Wardhaugh Thompson (1777), and Robert Hamilton (1777/9). Hamilton's *An Introduction to Merchandize*[1] is undoubtedly the most important from this group. It not only introduces some important practical costing techniques but also combines these with a sound exposition of the theory in a structure which emphasizes the role of opportunity cost and the managerial uses of costing as an aid to improving efficiency.

M. J. MEPHAM is a Senior Lecturer in Accounting, Heriot-Watt University, Edinburgh.

[1] Robert Hamilton, Ll.D. (1743-1829) was Rector of Perth Academy (1769-79), Professor of Natural Philosophy at Marischal College, Aberdeen (1779-1817) and Professor of Mathematics at the same university (1817-29) (Mepham, 1983).

It has been claimed (Mepham, 1983) that the value of Hamilton's work in this area has been insufficiently recognized because the versions of *Merchandize* which most researchers have consulted have not included his full text. The complete description of his costing system only appears in the first edition (1777/9), which is held by relatively few libraries and it has not been reproduced in facsimile form. This article surveys Hamilton's contribution to the theory of cost and management accounting as it is expounded in the first edition and all references and page numbers will relate to volume II of this edition.

Although Hamilton described the traditional 'Italian Method' of bookkeeping, he recognized that the accounting records should be tailored to the requirements of the businessman and the nature of the business. For example, in the first five editions of his book, he provides a remarkable set of problems on the design of accounting systems for a bank, an insurance company, an insurance broker, a bleacher, a brewer, and a linen manufacturer (Part V, Chapter VII, p. 277).[2] This case-study approach would not be out of place in a modern text. He fully recognized that the management of the more complex production systems that were being created required more detailed cost information than could be obtained from the transaction-based system used in 'merchants accounts'. In Chapter V of Part V (pp. 263-70), which deals with the accounts of 'artificers and manufacturers', he criticizes manufacturers who maintain only a sales day book and a personal accounts ledger (perhaps supplemented by a cash book and invoice book), and he describes the books that he would recommend (Sections 152, 153). He suggests that a good system should include: a Book of Materials (i.e., a stores ledger), a Book of Wages (for recording and charging out wages), a Book of Work (a cost ledger which also records goods sent to and received from outworkers), the Journal (for recording purchases, sales, etc., and a monthly summary of the quantity and value of work manufactured), and the Ledger. The ledger would include 'Accompts for the different branches under which the expence of the business may be distributed, as, materials, wages, upholding of machinery, rents, excise, incident charges, &c' (p. 265), a 'general accompt of the trade or manufacture' (this is a Work-in-Progress Account) and 'one or more accompts for manufactured goods' (i.e., Finished Goods Accounts).

Hamilton's suggestion that expenses should be recorded in a number of appropriate expense accounts is in line with current practice, but in the eighteenth century it was much more common for expenses to be debited directly to 'venture' or other 'profit centre' accounts. Another development is Hamilton's suggestion that the expense account balances should be transferred at annual intervals to the 'Work-in-Progress' Account, so that the annual profit on manufacture can be calculated. Accounting texts were beginning to advocate the regular annual calculation of profit in the second half of the eighteenth century; before then the balancing of the books had often been carried out at irregular intervals, except in farm and estate accounting. It should be noted that Hamilton assumes that profit is to be recognized when manufacturing is complete, not deferred until sale. Unsold goods are valued at selling price and he describes one system which allows for the books for a given year to be kept open until all the production for that year is completed (pp. 269-70).

---

[2] Linen manufacture was added in the second edition (1788).

Hamilton illustrates his chapter on 'Tradesmens Accompts' with examples based on a shoemaker's business and a linen manufactury. Dodson (1750) also illustrates the accounts of a shoemaker's business and Thompson uses the example of linen manufacture (1777, pp. 243-53). Thompson, however, specifically states that his details are not taken from practice, whereas the detailed observations made by Hamilton (for example in Section 159, p. 269) seem to suggest that his system may have been in operation.

Hamilton's linen manufacture example is by far the more important and the more detailed of the costing illustrations that he provides. It was natural for Hamilton, a Scot, to base his exposition on textile manufacture because by 1777, when he was writing *An Introduction to Merchandize* in Perth, textile manufacture had become very important in that town (Scott, 1796, p. 513). It can be assumed that Hamilton would know of the local manufacturies and their business methods and his discussion is, thus, likely to have been based on his observations.

In other respects, the linen industry was an obvious practical setting for introducing costing since it was the first major industrial success in Scotland and a case can be made for believing that the origins of industrial cost accounting were in this industry.

THE SCOTTISH LINEN INDUSTRY

At the time of the Treaty of Union (1707), textiles and black cattle were the only Scottish exports to England. The importance of the market in textiles was emphasized by Scottish supporters of the Union and the progress of the industry was aided by assistance given by the Board of Trustees for Fisheries and Manufactures in Scotland which was founded in 1727 to administer the funds provided by the Treaty of Union.

At the beginning of the century it was recognized that the bleaching process was a major weakness of Scottish linen manufacture; to be well bleached the cloth had to be sent to Holland or England. During the century there was considerable experimentation in this area and much improvement was achieved but the capital investment required was significant. Progress was not rapid, nor was it one of uniform advance, but 'Output rose three-fold in volume and four-fold in value between years 1736-40 and 1768-72—nearly thirteen million yards were woven yearly at the latter date' (Smout, 1969). By the end of the century the Scottish linen manufacture had become a major British industry.

Durie (1979) describes the five main processes that were involved from flax to finished cloth: (a) growing and harvesting the flax; (b) rippling (removing the seed), retting (separating the fibres), scutching (removing the bark) and heckling (combing out the fibres); (c) spinning; (d) weaving; and (e) bleaching.

Although it was not until 1787 that the first mechanised flax-spinning mills appeared in Scotland, well before then there had been developments in the system of manufacture which required considerable investment. These changes have led some commentators to talk of the 'proto-factory' (Freudenberger and Redlich, 1964; Chapman, 1974). The requirement for a significant investment of capital in buildings and equipment was one feature of the proto-factory; another two features were the use of a supervised labour force working at the employer's premises rather than outworkers, and the development of production methods that were designed for 'flow production' (Chapman, 1974). Hamilton's genius is demonstrated by the fact that he recognized the accounting implications of each of these and incorporated appropriate developments into a theoretically consistent system.

WAGE EARNERS AND ACCOUNTING FOR WAGES

Textile manufacture was very important in providing employment in eighteenth-century Scotland and changes which were introduced in the pattern of employment had important repercussions for the economy. In the second half of the century a pronounced increase in the demand for textiles led manufacturers to move from the 'domestic' or 'putting-out' production system, where the processing was carried out in the workers' own homes, to a centralized administrative system providing them with greater control over the productivity of the work staff. Pollard discusses this change (1965, pp. 34-5). In the new system those employees working on the employer's premises as wage earners might receive a day wage rather than the piece-rate system of remuneration which was often used for outworkers. Johnson (1984) considers that these changes encouraged the development of cost accounting.

Whereas Thompson's description of textile cost accounting assumes the domestic system, Hamilton's is not restricted in this way but his illustrative 'Book of Wages' is for a shoemaker's business. He suggests that this would contain

> the names of the journeymen and other servants employed, the work they are employed at, the number of days and, rate per day, if they be paid by days-wages, or the quantities of work done, and rate, when paid by the piece. It may be filled up once a week, or oftener, if necessary.
>
> In some trades, it may be convenient to keep the book of wages in the form of a ledger, and allot an accompt for each journeyman, where the quantity and value of the work he performs is entered. (Section 152, p. 264)

Although the decision-oriented features of Hamilton's system are very marked, the foregoing quotation does not expressly advocate the recording of a dayrate worker's output nor the calculation of unit costs. The absence, at this point in the text, of any specific comment on employee productivity has led Sutcliffe and Burrows (1984) to express the view that:

> Conceivably the wage book would lend itself to . . . determining the productivity of employees, but its application for such purposes was not considered. The detailed employee records were developed not to generate information on employee performance, but to provide an additional safeguard against fraud: to ensure that employees were paid only once for work completed.

Although the statement about evaluating productivity may be factually correct, consideration of other material in the chapter can only lead to a rejection of the view regarding prevention of fraud. The misunderstanding must have arisen because Sutcliffe and Burrows did not have access to the first edition of *An Introduction to Merchandize* which is more detailed on this and other related topics. Hamilton clearly did intend his system to provide the manufacturer with the 'information he needed to judge alternative opportunities' (Johnson, 1984) and, to this end, he did have an interest in the evaluation of worker productivity. In his linen manufacture example he points out that, although the wages payable to weavers employed in the manufacturer's own workshop may well be less than the remuneration of outworkers for the same output, this benefit has to be balanced against the workshop expenses. He outlines a procedure for making such an evaluation:

> In order to judge which is most beneficial, he may open an accompt of weaving, and enter the wages paid to his own weavers, and the expenses attending the work-shop, on the Dr. and the wages which would have been paid to other weavers, on the Cr. The balance shows the gain or loss by weaving it at home; and the expence of weaving, when delivered out, is transferred to the Dr. of the brown linen accompt. (Section 157, p. 268)

This describes a sophisticated form of analysis. Unfortunately the paragraph (along with other important material) disappears from the second and later editions of the text.

FLOW PRODUCTION AND PROCESS COSTING

Without mechanization for most of the eighteenth century, conventional definitions of 'factory production' do not fit the production methods that were in use in that century. A major feature of the textile proto-factory at this time was, however, the inauguration of flow production (Chapman, 1974). Such a flow of production features prominently in Hamilton's discussion of a process costing system.

Hamilton assumes a manufacturer who purchases or imports rough flax, dresses it, spins it into yarn, weaves the yarn into cloth, and bleaches the cloth. At the intermediate stages, external sales are made if this is considered profitable and the manufacturer uses both outworkers and employees paid on a time basis (Section 154, p. 265).

The costing system makes use of a number of specialized 'subsidiary' books for recording the inputs of resources and the quantities and values of material flowing through the processes. The system that Hamilton describes is an integrated one so that the ledger includes appropriate process accounts containing summarized information on the purchase of the rough flax and the details of the above-listed processes in:

> an accompt of rough flax,
> an accompt of dressed flax,
> an accompt of yarn,
> an accompt of brown linen and
> an accompt of white linen. (pp. 267-8)

In addition there might also be:

> an accompt of weaving (when some of this is performed within the manufacturer's own work-house) and an accompt of boiling (when the manufacturer has his own boiling house). (p. 268)

The system is described schematically as illustrated in Appendix A.

NON-INDUSTRIAL COST ACCOUNTING

Wells (1978, pp. 44-9) has pointed out that the emphasis on identifying the outcome of each of the various 'branches of trade', which was a feature of the seventeenth- and eighteenth-century expositions of mercantile and estate accounting, led naturally to 'departmental accounts' which were precursors of the industrial cost accounting system. He reproduces a 'Meal Accompt' from Hamilton and an earlier example of estate accounting from Monteage (1675) to illustrate this point.

Concurrently with the developments in industrial cost accounting there was a parallel development in farm accounting. Arthur Young (1770a, pp. 210-14; 1771)[3] proposed a farm accounting system in which there was a 'departmental' ledger account for each field. His view was that the farmer's 'accounts may be said to be the foundation of good husbandry' (1770a, p. 206) and he continually emphasized the benefits of appropriate analysis and regular (annual) summaries of farm and estate activities. In his extensive analyses of the financial implications of alternative agricultural plans he often used the T-account format as a convenient way of marshalling the anticipated costs and benefits and this suggests that he believed that his readers would be familiar with this framework.

Hamilton, also describes a farm accounting system necessitating a 'Field Book', which would contain separate accounts for individual fields (pp. 275-6). Of this he says:

> The register of the same field, in successive years, is continued from page to page, that the success of the different manures, rotations, and methods of treatment, may be easily compared, and a judgement formed of the whole, when continued for a sufficient length of time.

Young makes similar points (1770a, p. 205). Edwards (1937a, p. 254) reproduces Hamilton's example.

Established eighteenth-century mercantile and estate accounting systems used departmental or 'branch of trade' accounts which could be adapted to provide improved financial record-keeping methods for farming (where the Agricultural Revolution was underway) and manufacturing (to meet the needs of the Industrial Revolution). Wells considers that these accounts 'provide a unique example of a technique originating in one set of circumstances and being adapted as circumstances changed' (1978, p. 48). Hamilton's process costing system and field book illustrate this adaptation.

TRANSFER PRICING

An important feature of Hamilton's system is the proposal that transfers from one process to the next should be made at market price. Again there is a parallel with farm and estate accounting where transfers from one 'branch' of business to another might be recorded at market price (Wells, 1978, p. 46). In contrast, Thompson records inter process transfers at cost, not market value. An implication of Hamilton's approach is that the processes are 'profit centres' and the balances on:

> the accompt of dressed flax,
> the accompt of yarn,
> the accompt of brown linen and
> the accompt of white linen

show respectively: 'the gain or loss by dressing flax', 'the gain or loss by spinning', 'the gain or loss by weaving' and 'a comparison of the profit obtained by selling the linen, white or brown' (Section 156, pp. 267-8).

---

[3] Arthur Young (1741-1820) was a prolific writer and researcher on agricultural topics who did much to transform agriculture into a science. From 1793 he was secretary of the semi-official Board of Agriculture.

The comparison of the weaving costs of wage earners and outworkers has been discussed earlier in this article. The process of determining the profit from boiling is only advocated when the manufacturer undertakes not only the boiling of his own yarn but also does such work for others. In such circumstances:

> it will be proper to open an accompt of boiling, and enter the value of materials, rent, wages, and other expenses, on the Dr. and the sums received for boiling yarn belonging to others, or chargeable on his own, at the same rate, on the Cr. The balance of this accompt will show the gain or loss by boiling. (Section 158, p. 268)

Where the manufacturer does not do such outside work, an 'accompt' of boiling is not necessary since 'the expense of boiling, along with that of weaving, may be entered on the Dr. of the brown linen accompt'.

A comparison can be made between the analysis of a textile manufacturer's profit using Hamilton's system and the analysis given in the 1748 Profit and Loss Account of the British Linen Company. This company, which later became the British Linen Bank, seems to have used outworkers and subcontractors, but it did have its own bleachfield (Malcolm, 1950, pp. 237-40). The Profit and Loss Account shows the company's profit from each of the following sources: Fine Linen, Coarse Goods, Hemp, Yarn, Dressed Flax, and Undressed Flax.

The firm of Marshalls of Leeds was using a comparable system in the early nineteenth century:

> It is reasonable to suppose . . . that machine records were started soon after 1804 . . . clerks in the mill's office . . . condensed the records of the four main departments—hackling, spinning, weaving and bleaching—on a half yearly basis showing the inputs and outputs by quantity and value for each grade of raw material processed, constructing in effect a set of process accounts. (Rimmer, 1960, pp. 121-2).

Hamilton makes no provision for the elimination of unrealized profit in the year-end inventory valuation, but, apart from this, his system identifies many of the features of a modern integrated costing system, although it was written when the Industrial Revolution was scarcely under way.

Hamilton's transfer pricing method was retained in the second edition of *Merchandize*, but the detailed examples of the application of the method to different processes were removed and the text is not so clear. He states that the monthly transfers from the 'general accompt of the trade or manufacture' (i.e., the Work-in-Progress Account) to the Finished Goods Account should be made at 'the value of goods manufactured'. By this last phrase he must mean a standard selling price since he assumes that the Work-in-Progress Account will show a profit (or loss) and that a further profit (or loss) will arise in the Finished Goods Account if the actual selling prices differ from the standard selling prices. Littleton (1981, pp. 338-9) is critical of this part of Hamilton's work but the criticism is based on a misunderstanding arising from the use of one of the later editions in which the explanation of the system was curtailed.

Over one hundred years later Norton's *Textile Manufacturers' Book-keeping* (1889) agrees entirely with Hamilton's method of judging profitability:

> the only method of testing the economy of manufacturing departments that the author has found to be altogether satisfactory and reliable is . . . Credit each department with standard prices for its work done, and Debit it with its proportion of the expenditure. (p. 226)

Littleton is enthusiastic about Norton's book, which he considered to be one of three influential books on cost accounting to appear in England at the end of the nineteenth century (1981, p. 340); it is therefore ironic that, because of a misunderstanding, he should have been so disparaging about Hamilton's approach 110 years earlier.

JOINT COSTS AND DECISION-MAKING

Pollard states that eighteenth-century manufacturers were unable to deal with costing for joint products: 'not even the principles could be worked out' (1965, p. 223). There were also problems in farm accounting where the use of field accounts required an apportionment of the farmer's rent, tythes, poor levy etc. (Young 1770a). Yamey (1975) has pointed out, however, that Hamilton demonstrated an enlightened approach to the treatment of such costs.

Hamilton avoids the pointless consideration of alternative apportionment bases by focusing attention on the fundamental question of when it is appropriate to analyse profit to individual activities. He propounds the 'leading principle' that the calculation of the profit for any given 'stage of the manufacture' is only appropriate when there is 'an opportunity of beginning or desisting' at that stage (Section 154, pp. 265-6). When there is 'an opportunity of beginning or desisting' there is an opportunity cost involved in the decision either to begin or to desist. Hamilton proposes the integration of such opportunity costs into the accounting system and this leads to a decision-oriented system and an avoidance of joint cost problems.

RATE OF RETURN CALCULATIONS

The industrial revolution produced conditions where it was particularly important to compare profit with capital employed and there was an early awareness of the need to do this when appraising a new venture. In 1681, for example, the 'prospectus' for the New Mills Cloth Manufactury, issued by Sir James Stanfield, gave the forecast expense and revenue in considerable detail and emphasized that it was anticipated that the profit would be in excess of the legal rate of interest. (Scott, 1905, pp. lxxxiv-lxxxix). Contemporary accounting practices did not, however, assist the merchant or manufacturer to make such calculations, *ex post* the investment.

For much of the century the common procedure was to open an account for each individual venture or voyage or 'branch of trade'; assets and expenses attributable to a particular venture were debited to the venture account and revenue was credited. No distinction was made between capital and revenue expenditure as it was intended that the account should remain open to cover the venture's complete history.[4] At the venture's termination the results were calculated and transferred to the Profit and Loss Account. This procedure was possible because the regular (annual) calculation of mercantile profit was uncommon and the Profit and Loss Account remained open in the ledger to receive the profits and losses from individual ventures as and when these ventures were completed.

---

[4] The word 'asset' was not even part of accounting terminology.

This combination of features complicated any attempt by a manufacturer to calculate his annual rate of return. Pollard (1963) considers that the calculation of rates of return was (at that time) largely impracticable. In contrast, the regular calculation of annual profit was common in farm and estate accounting and, in the second half of the eighteenth century, agricultural writers did make estimates of rates of return (Young, 1770a, Vol. I, pp. 324, 340; Vol. II, pp. 18, 25, etc.).[5]

RESIDUAL INCOME

As the century passed Hamilton (and other writers) advocated the adoption of annual accounts and this became an established feature of the system described in accounting texts. In the light of this development one might have thought that the relationship of profit to capital employed would have warranted consideration but Hamilton was the only eighteenth-century writer, of an English-language accounting text, to discuss the topic. This he did in Chapter III of Part V under the title of 'Method with Allowance of Interest'. In that chapter he proposed an alternative to the rate of return calculation by suggesting that a period's profit should be charged for the use of funds employed in earning it.[6]

This measure of business performance has been adopted by a number of divisionalized organizations in recent years, and it has been extensively discussed in the management accounting literature under the name of 'residual income'. The term 'residual income' seems to have been introduced by the General Electric Company (Anthony, Dearden, and Vancil, 1965; Solomons, 1965) who were using the method in the 1960s although 'apparently' they do so no longer (Kaplan, 1984). Despite its absence from accounting texts, the method, but not the name, was in use in eighteenth-century Britain (Pollard, 1963, pp. 75-91). At the time it had at least two practical advantages over rate of return calculations. First, the method could be used. Second, in co-partnerships the problems arising from unequal capital contributions could be dealt with by allowing interest on the partners' capitals (Pollard, 1963; Moss, 1983). The method may well have originated with partnerships.

Hamilton was well aware of the advantages of residual income. He advocated its use as *the* measure of business success and seems to have placed rather more importance on it than on his process costing material, as Chapter III was exempted from being cut in the second edition whereas some costing material was excised.

THE INTEREST RATE

The medieval objections to usury had been moderated by the eighteenth century. Adam Smith notes that:

> In some countries the interest of money has been prohibited by law. But as something can every-where be made by the use of money, something ought every-where to be paid for the use of it. (1786, Book II, Chapter IV, p. 43).

---

[5] He states that in his opinion: 'no less profit than 20 per cent should be thought, in agriculture, great, or even sufficient. There are no insurances in farming' (Young, 1770a, p. 342).

[6] Bursal (1986) provides details which suggest that there may have been earlier advocates of residual income in Germany. Young's discussion of the method (1770) also predates Hamilton's.

He notes however that:

> In countries where interest is permitted, the law, in order to prevent the extortion of usury, generally fixes the highest rate which can be taken without incurring a penalty. (1786, p. 43)

Gordon, writing in 1763, notes that 'the interest of money was reduced to 5 per cent from the 29th of September 1714, and this statute continues in force to this day' (pp. 352-3).

It seems, however, that this maximum rate was not always observed since Malcolm says that 'If any Thing beside the legal Interest is paid for the Loan of Money, it has nothing to do with the Person's Account' (1731, p. 51). This seems to mean that any interest paid in excess of the legal maximum should be recorded as miscellaneous expenses and should not be identified with the lender's account. Since Malcolm (who was later to enter the Church) generally takes a moral standpoint, his comments suggest that it was not considered immoral to exceed the maximum rate of interest.

Although the interest rate on a loan would vary with the risk involved and the reputation of the borrower, it was possible, from the founding of the Bank of England at the end of the seventeenth century, to speak of a 'general rate of interest' (Knight, 1932) and Hamilton identifies this as being the appropriate rate to use for his 'Method with Allowance of Interest':

> In all commercial countries there is a fixed rate of interest, and the merchant's gain should only be estimated by the excess of his gross profits above the interest of his stock. The latter may be obtained with little risk or trouble; the former alone is the reward of his industry and the compensation for his hazard. And, if the profit of his trade be less than his stock would have yielded at common interest, he may properly account it a losing one. (Part V, Chapter III, Section 135, p. 246)

Hamilton wrote this during his time at Perth. Ten years previously the linen manufacturer William Sandeman, another Perth citizen, very conscious of the same point, wrote in a letter: 'I have dealt my self to the extent of £10,000 p.a. for these two years past in the linen trade, and have not made common interest on the money employed . . .' (Durie, 1973).

INTEREST AS OPPORTUNITY COST

In making the comparison between the return from his investment in the linen trade and the return that he could have obtained at common interest, Sandeman is adopting an opportunity cost viewpoint. He implies that he regards the cost of his 'money employed' in the linen trade as being the lost opportunity of investing it elsewhere at 'common interest'. One hundred and fifty years earlier Robert Loder's farm accounts (for the period 1610-20) show that he also recognized the opportunity cost of the investment in his farm. Each year he explicitly charged against his farm profits the cost of his investment (Fussell, 1936; Yamey, 1962). Parker (1969) describes the development of the opportunity cost concept and its use in business decision making. He discusses Loder's use of opportunity cost but otherwise concentrates on the nineteenth and twentieth centuries. Arthur Young and Robert Hamilton were, however, discussing the concept in the eighteenth century.

In his agricultural writings Young gives many examples of estimated 'yearly accounts' (i.e., profit and loss accounts) for given investments and specified farming plans (1770b, 1788). In these he regularly makes a charge for interest. He provides an explanation for this in a discussion of a particular scenario where an individual has the choice of either working as a farm labourer or investing his savings of £100 in a small farm:

> Now as he maintained himself by his labour before, and saved something besides; and, as he does no more than maintain himself after he is a farmer, without security from the misfortunes of bad crops; it is extremely evident, that he loses the interest of his money by turning farmer.
>
> But as all contingencies are hazardous, the loss attending this farm is best stated thus:

	l. s. d.
Deficiency,	2 19 0
Interest of stock,	5 7 0
Total loss,	£8 6 0

(Young, 1770b, Vol. I, p. 129)

Hamilton expresses a similar view as follows:

> If we buy goods at long credit, and sell them for ready money, or on short credit, we may happen to have the money in our hands for some time; and, as we may lend it out at interest, *or employ it in other branches of our business*, during the interval, the advantage arising from it . . . should be added to the profits, or deducted from the loss of the accompt which yields it. (Section 135, p. 247, emphasis added)

This advocacy of use of opportunity cost as a managerial tool should be contrasted with the views of the economists of the period. In the *Wealth of Nations* Adam Smith did recognize 'opportunity cost' in the course of a discussion of the payment of bounties (1786, Vol. II, p. 263), but that discussion is in a macro economic context. He did not it seems, consider the relevance of opportunity cost to the individual businessman.

ACCOUNTING FOR RESIDUAL INCOME

Hamilton is aware of the problems that arise when an attempt is made to calculate the residual income of the individual 'branches of trade' and yet he recognizes that such computations could be useful (Part V, Chapter III, Section 135, p. 246). He proposes to solve this difficulty by incorporating imputed interest charges into the double entry system. He considers that accrual accounting is unsuitable for this purpose and he sets forth, in sections 136 to 140, an alternative system of cash accounting.

Hamilton provides a brief example of the operation of his system but this is not particularly helpful and a more detailed illustration is given here to facilitate the explanation.

Hamilton's method requires two ledgers. Ledger 1 deals only with transactions that involve (a) the receipt or payment of cash, and (b) credit transactions where interest is chargeable or receivable. It 'contains the stock, profit and loss, and subsidiary accompts in the common form' but the only personal accounts included are those that bear interest. Accounts dealing with 'goods and voyages' are kept in 'a peculiar form'. 'On the Dr. of the accompts of goods, there is entered the sums of money paid out for purchase or charges; and on the Cr. the sums received, for what is sold.' Credit purchases and sales are not entered in this ledger until the cash is paid or received. The accounts in this ledger are provided with interest columns to calculate interest payable and receivable from the date that the transaction takes place. In the example, an interest rate of 10 per cent has been used and it has been assumed that all transactions take place half way through the accounting period.

Ledger 2 records the credit transactions and the cash settlements necessary to ascertain amounts owing and the inventory balances; it 'contains accompts of goods and voyages, in the common form, and all personal accompts, except those on which interest is computed'.

In Figure 1 it can be seen that a trial balance extracted from Ledger 1 would balance; however Ledger 2 would not. The opening balances from that figure are evident, however the balances in the centre columns arise from credit transactions not previously entered in ledger 1 until cash passes. During the year the following transactions take place:

FIGURE 1
ACCOUNTING FOR RESIDUAL INCOME

	Ledger 1		*Credit Transactions*		*Ledger 2*	
	£	£	£	£	£	£
Venture 1	1600		150		1750	
	100					
Venture 2	1200		350		1550	
	200					
Debtors					300	
Cash	1000					
Loan		100				
Creditors				500		500
Capital		4000				
	4100	4100	500	500	3600	500

Cash Purchases	Venture 1	£1500
	Venture 2	1500
Credit Purchases	Venture 1	2050
	Venture 2	1650
Cash Sales	Venture 1	2000
	Venture 2	1000
Credit Sales	Venture 1	2500
	Venture 2	2700
Receipts from Debtors		4500
Payments to Creditors		3200

It is assumed that the interest rate for the loan is 10 per cent and that all cash balances earn interest at this rate. The balances of goods on hand at the period end are £1,000 for Venture 1 and £1,300 for Venture 2. Elsewhere Hamilton advocates the use of deprival value to value unsold goods but here it will be assumed that they are to be valued at cost. The ledger accounts would be written up as illustrated in Appendix B.

Hamilton assumes that the cash in hand will not be able to earn interest and he recognizes that this will create a difference between interest on the capital invested and interest charged out to profit centres. He argues that this difference should not be large:

> The balance of the interest-accompt will be nearly equal to the interest of the nett stock. It would be exactly equal, if we never kept any money on hand; and, as merchants are careful to regulate their affairs so as never to have much unemployed, the difference will not be considerable. (Part V, Chapter III, Section 140, p. 249)

If the difference were to be excessive this would indicate that the cash balance was not being controlled efficiently.

The method proposed achieves the objective of identifying the interest element of profit-centre profits and Hamilton is enthusiastic about its merits. He does, however, recognize that it is considerably more complex than the conventional procedures and thus might only be used for 'accompts of greater extent':

> This form of book-keeping is the most perfect of any; but the additional trouble is considerable. It is therefore improper where the articles are small and numerous; but, when the articles are generally extensive, and the credit long, it may be used to advantage. If it be thought too tedious to follow it through every branch of the business, we may confine it to accompts of greater extent and importance, and to keep the others in the common manner. (Part V, Chapter III, Section 140, p. 249)

Anthony (1975) has recently proposed a system of accounting for interest with some similarity in its aims to that described by Hamilton. Before dismissing Hamilton's suggestions of accounting for interest as impracticable and unnecessary, Anthony's views might be noted. He says:

> Although there is general acceptance of the fact that interest is an element of cost, the tendency is to dismiss rather quickly the idea that this cost should be recorded in the accounts, on the grounds that it is not feasible to do so and that even if it were feasible, the effort would not be worthwhile. (1975, p. 9).

Anthony argues that 'the idea is both feasible and beneficial'.

RESIDUAL INCOME IN PRACTICE

Although there is no evidence that Hamilton's 'most perfect' accounting system was ever used in the complete form that he describes, a charge for the cost of capital was not unusual in eighteenth-century accounts. Pollard says: 'there is much evidence to show that "profits" in common parlance, were often understood to be the surplus after interest was paid' (1963, p. 80). Examples of its use by textile manufacturies can be found. The 1748 Profit and Loss Account for the British Linen Company includes a charge for interest on the capital contributed by the partners. Such charges would have been part of the profit-sharing scheme.

Stone (1973) notes its use in the nineteenth century by the Charleton Cotton Mills in Manchester from 1810 to 1889 and Norton, at the end of the century, is definite in his advice that it should be used by textile manufacturers. He says: 'An important charge, which should never be omitted in calculating the profit of a business is interest upon the Capital employed therein' (1976, p. 79). The reason he gives is that there is an opportunity cost and this must be recognized:

> If the Capital were borrowed the business would have to pay interest thereon and the proprietor of the concern could obtain interest on his capital if it were employed elsewhere; consequently the concern should be charged with interest as an expense of the business. (Norton, 1976, p. 29)

SUMMARY

Although Hamilton's cost accounting innovations have been praised by several recent commentators (Crossman, 1953; Garner, 1954; Chatfield, 1977; Wells, 1978; Mepham, 1983) they seem to have had no influence on his contemporaries. There were developments on the Continent (France) during the first three-quarters of the nineteenth century (Edwards, 1937b) but there was no consideration of cost accounting, in any English-language text, until Garcke and Fells produced their *Factory Accounts* (1887), and George Norton his *Textile Manufacturers' Book-keeping* (1889), more than one hundred years after the first edition of *Merchandize*.

This failure to influence the course of events is puzzling but it should not prevent us from recognizing the merit of Hamilton's work. *Merchandize* is important because it contains an early description of a completely integrated process costing system. However, summarizing the work in this way does not adequately indicate its value. It is particularly noteworthy because of its emphasis on the managerial role of cost accounting. Hamilton introduces the use of profit centres and the techniques that he suggests include transfer pricing and the use of opportunity costs. In this respect he was far in advance of any of his contemporaries.

Another important feature is Hamilton's treatment of residual income. The increasing rate of economic development in eighteenth-century Scotland and the increasing amounts of capital that this required led traders to compare their business profit (or prospective profit) with the capital that they had invested (or might invest). One way of relating capital to business operations is to charge these operations with the cost of the capital employed. This method was used quite frequently towards the end of the century and Hamilton presumably would have been aware of this when he wrote his chapter on 'Method with Allowance of Interest'. He appreciated that making a charge for the foregone interest on the trader's capital could provide him with useful information because: 'if the profit of his trade be less than his stock would have yielded at common interest, he may properly account it a losing one'.

Adam Smith had discussed 'lost profit' as an opportunity cost in *The Wealth of Nations* but he did not relate this concept to the individual businessman and he did not think of it as a decision-making tool. Hamilton, however, saw not only how opportunity cost could be of use to the businessman but also how it could be incorporated into the accounting system. Both his advocacy of residual income and his use of profit centres and transfer pricing in his costing system, were based on the wish to provide a decision relevant accounting system.

REFERENCES

Anthony, R. N., *Accounting for the Cost of Interest*, D. C. Heath, 1975.

Anthony, R. N., J. Dearden, and R. F. Vancil, *Management Control Systems: Cases and Readings*, Irwin, 1965.

British Linen Company, Profit and Loss Account, 1748 (National Library of Scotland, Saltoun Collection, MS 17594, item 52).

Bursal, N., 'The Use of Interest as an Element of Cost in Germany in the 16th and 17th Centuries', *The Accounting Historians Journal*, Spring 1986.

Chapman, D., 'The Textile Factory Before Arkwright: A Typology of Factory Development', *Business History Review*, Winter 1974.

Chatfield, M., *A History of Accounting Thought*, Robert Krieger, 1977.

Crossman, P., 'The Genesis of Cost Control', *The Accounting Review*, October 1953.

Dodson, J., *The Accountant, or, the Method of Book-keeping Deduced from Clear Principles*, J. Nourse, 1750.

Durie, A. J., 'The Markets for Scottish Linen 1730-1775', *The Scottish Historical Reveiw*, April 1973.

———, *The Scottish Linen Industry in the Eighteenth Century*, John Donald, 1979.

Edwards, R. S., 'Some Notes on the Early Literature and Development of Cost Accounting in Great Britain', *The Accountant* 7, 14, 21, 28 August; 4, 11 September 1937a.

———, 'A Survey of French Contributions to the Study of Cost Accounting during the 19th Century', The Accounting Research Association, published as a supplement to *The Accountant*, 26 June 1937b.

Freudenberger, H., and F. Redlich, 'The Industrial Development of Europe: Reality, Symbols, Images', *Kyklos*, XVII, 1964.

Fussell, G. E. (ed.), *Robert Loder's Farm Accounts 1610-1620*, Camden 3rd Series, Royal Historical Society, 1936.

Garcke, E., and J. M. Fells, *Factory Accounts*, Crosby Lockwood and Co., 1887.

Garner, S. P., *Evolution of Cost Accounting to 1925*, University of Alabama Press, 1954.

Gordon, W., *The Universal Accountant*, Vol. I, printed for the author and A. Donaldson, 1763.

Hamilton, R., *An Introduction to Merchandize*, printed for the author, Edinburgh, 1777/9.

Johnson, H. T., 'The Role of Accounting History in the Education of Prospective Accountants', *Arthur Young Lecture* No. 6, University of Glasgow, 1984.

Kaplan, R. S., 'The Evolution of Management Accounting', *The Accounting Review*, July 1984.

Kendrick N., 'Josiah Wedgwood and Cost Accounting in the Industrial Revolution', *Economic History Review*, Vol. 23, 1970.

Knight, F. H., Article on 'Interest' in E. R. A. Seligman (ed.), *Encyclopaedia of the Social Sciences*, Macmillan, Vol. 8, 1932.

Littleton, A. C., *Accounting Evolution to 1900*, American Institute of Accountants, 1933, reprinted by University of Alabama Press, 1981.

Malcolm, A., *A Treatise of Book-keeping*, J. Osborn et al., 1731.

Malcolm, C. A., *The History of the British Linen Bank*, T. and A. Constable Ltd., 1950.

Marshall, G., *Presbyteries and Profits*, Clarendon Press, 1980.

Mepham, M. J., 'Robert Hamilton's Contribution to Accounting', *The Accounting Review*, January 1983.

Monteage, S., *Debtor and Creditor Made Easie*, Ben. Billingsley, 1675.

Moss, M., *Forgotten Ledgers, Law and the Business Historian*, paper presented at the Sixth Annual Congress of the European Accounting Association, 1983.

Norton, G. P., *Textile Manufacturers' Book-keeping*, A. Jubb, Huddersfield and Hamilton, Adams and Co., 1889; 3rd Edition, 1894, reprinted by Arno Press, 1976.

Parker, R. H., *Management Accounting: An Historical Perspective*, Macmillan, 1969.

Pollard, S., 'Capital Accounting in the Industrial Revolution', *Yorkshire Bulletin of Economic and Social Research*, November 1963.

———, *The Genesis of Modern Management*, Harvard University Press, 1965.

Rimmer, W. G., *Marshalls of Leeds Flax-Spinners 1788-1886*, Cambridge University Press, 1960.

Roll, E., *An Early Experiment in Industrial Organisation being a History of the Firm of Boulton and Watt, 1775-1805*, Longmans, Green and Co., 1930.

Scott, J., 'Parish of Perth', chapter XIX of *The Statistical Account of Scotland*, J. Sinclair (ed.), Vol. 18, printed by W. Creech, Edinburgh, 1796.

Scott, W. R., *The Records of a Scottish Cloth Manufactory at New Mills*, Haddingtonshire 1681-1703, Scottish Historical Society, 1905.

Smith, A., *The Wealth of Nations*, Vol. II, 4th edn, Strahn and Cadell, 1786.

Smout, T. C., *A History of the Scottish People 1560-1830*, Collins, 1969.

Solomons, D., *Divisional Performance: Measurement and Control*, Financial Executives Research Foundation, 1965.

Stone, W. E., 'An Early English Cotton Mill Cost Accounting System: Charlton Mills, 1810-1889', *Accounting and Business Research*, No. 10, Spring 1973.

Sutcliffe, P., and C. Burrows, *Accounting for Labour Costs and Performance: The Objectives of North, Hamilton, Battersby and Garcke and Fells*, paper presented at the Meetings of the AAANZ and Accounting History Committee, University of Tasmania, 1984.

Thompson, W., *The Accomptant's Oracle*, York, N. Nickson for the author, 1777.

Wells, M. C., *Accounting for Common Costs*, University of Illinois, 1978.

Yamey, B. S., 'Some Topics in the History of Financial Accounting in England 1500-1900', in W. T. Baxter, and S. Davidson (eds), *Studies in Accounting Theory*, Sweet and Maxwell, 1962.

Young, A., *Rural Oeconomy or Essays on the Practical Parts of Husbandry*, T. Becket, 1770a.

———, *The Farmer's Guide in Hiring and Stocking Farms*, Vol. I, W. Strahan, 1770b.

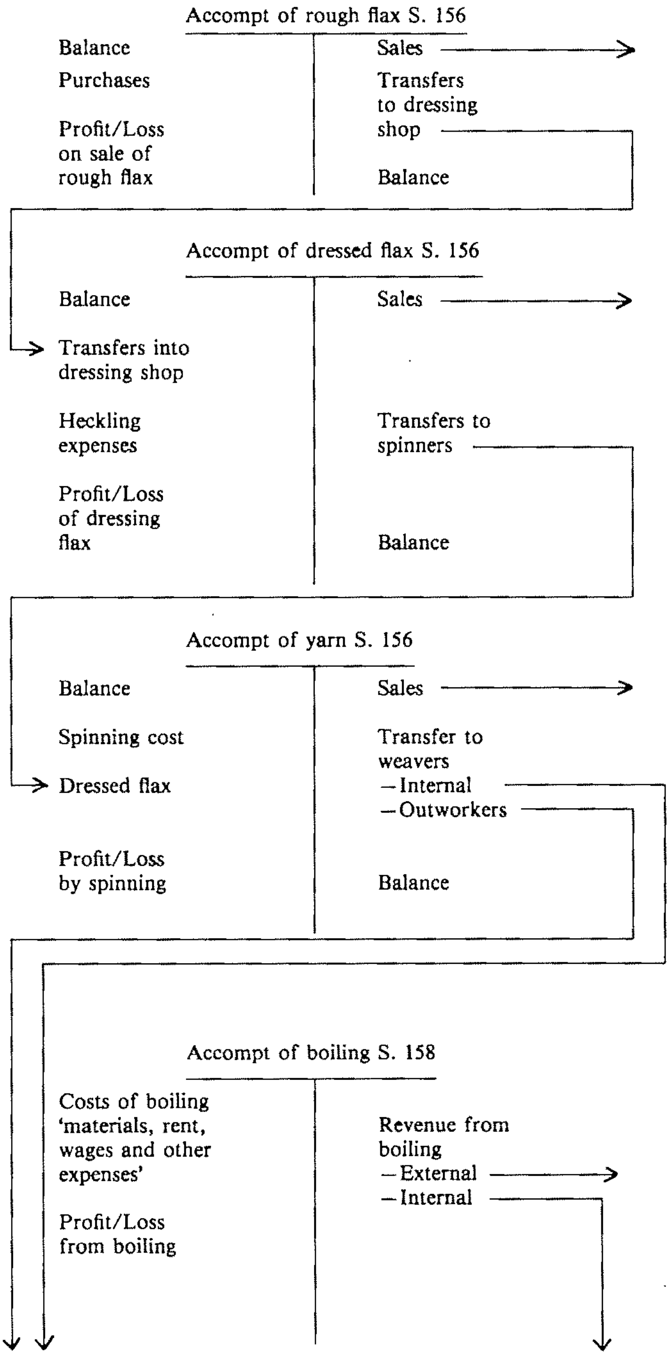
———, *The Farmer's Kalendar*, Robinson and Roberts, 1771.

———, 'On the Profit of a Farm', in *Annals of Agriculture*, Vol. 9, Printed for the Editor, Bury St. Edmonds, 1788.

APPENDIX A
FLOW PRODUCTION AND PROCESS COSTING

SUBSIDIARY BOOKS

LEDGER ACCOUNTS



Rough flax book (prime cost of flax, expenses of dressing and quantities processed)

Accompt of rough flax S. 156

Balance	Sales →
Purchases	Transfers to dressing shop
Profit/Loss on sale of rough flax	Balance

Accompt of dressed flax S. 156

Balance	Sales →
→ Transfers into dressing shop	
Heckling expenses	Transfers to spinners
Profit/Loss of dressing flax	Balance

Dressed flax book (quantities of flax received from heckling shop; delivered to and received from spinners; cost of spinning)

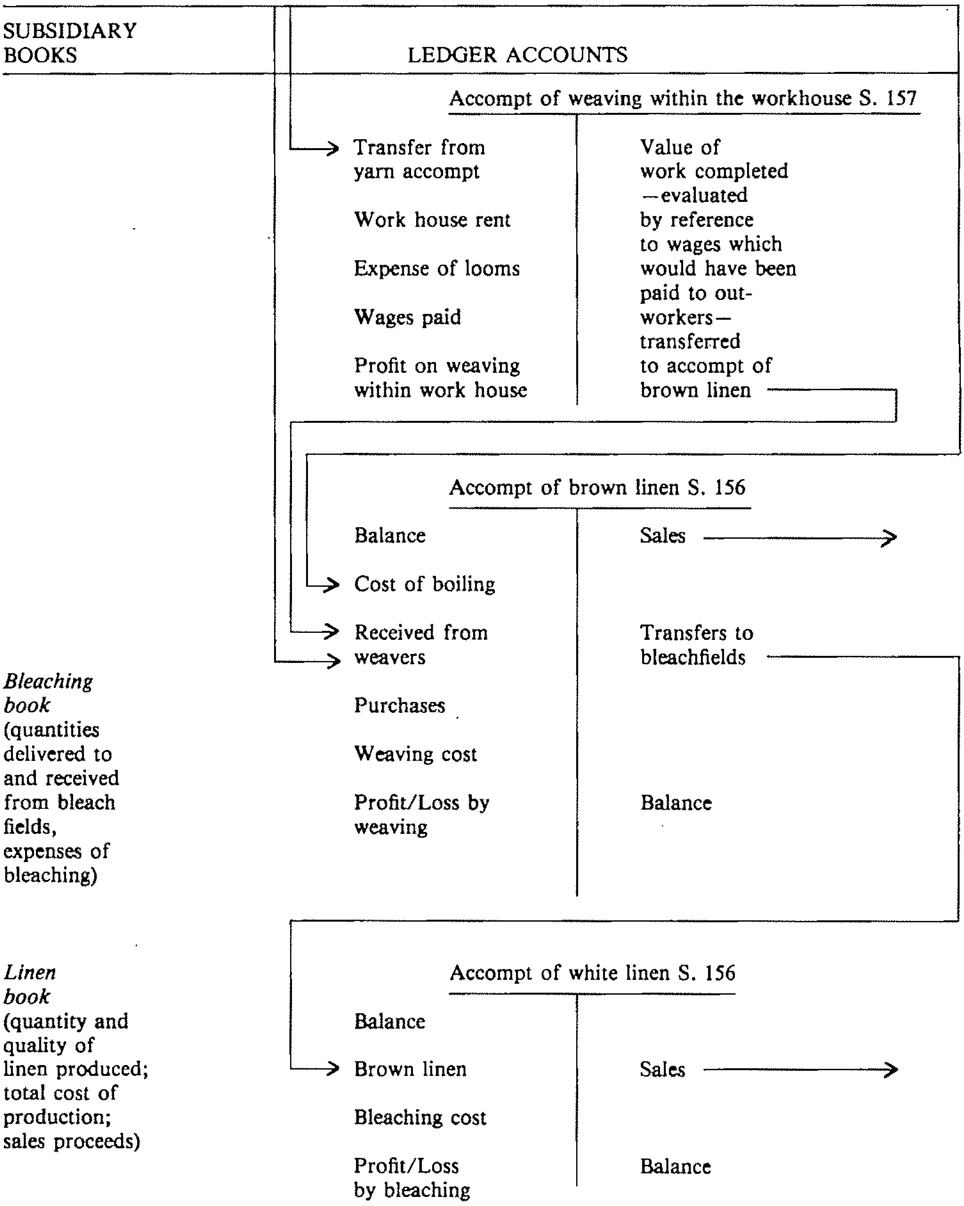
Accompt of yarn S. 156

Balance	Sales →
Spinning cost	Transfer to weavers – Internal – Outworkers
→ Dressed flax	
Profit/Loss by spinning	Balance

Yarn book (quantities and value of yarn received from spinners; expense of spinning, yarn delivered to weavers and linen returned; sales of yarn)

Accompt of boiling S. 158

Costs of boiling 'materials, rent, wages and other expenses'	Revenue from boiling – External → – Internal
Profit/Loss from boiling	



SUBSIDIARY BOOKS	LEDGER ACCOUNTS

Accompt of weaving within the workhouse S. 157

Transfer from yarn accompt	Value of work completed —evaluated by reference to wages which would have been paid to out-workers—transferred to accompt of brown linen
Work house rent	
Expense of looms	
Wages paid	
Profit on weaving within work house	

Accompt of brown linen S. 156

Balance	Sales
Cost of boiling	
Received from weavers	Transfers to bleachfields
Purchases	
Weaving cost	
Profit/Loss by weaving	Balance

Bleaching book (quantities delivered to and received from bleach fields, expenses of bleaching)

Accompt of white linen S. 156

Balance	
Brown linen	Sales
Bleaching cost	
Profit/Loss by bleaching	Balance

Linen book (quantity and quality of linen produced; total cost of production; sales proceeds)

APPENDIX B
ACCOUNTING FOR RESIDUAL INCOME

LEDGER 1

Venture 1

	Int			*Int*	
Opening Stock			Cash sales	100	2000
—in hand	160	1600	Receipts from debtors	110	2200
—sold on credit	10	100			
Cash purchases	75	1500	Closing stock		
Payments to creditors	100	2000	—in hand		800
Imputed interest		135	—sold on credit		400
Profit and loss		65			
		5400			5400

Venture 2

Opening stock			Cash sales	50	1000
—in hand	120	1200	Receipts from debtors	115	2300
—sold on credit	20	200			
Cash purchases	75	1500	Closing stock		
Payments to creditors	60	1200	—in hand		500
Imputed interest		110	—sold on credit		600
Profit and loss		190			
		4400			4400

Cash

Opening baláce	100	1000	Cash purchases		
Cash sales			—Venture 1	75	1500
—Venture 1	100	2000	—Venture 2	75	1500
—Venture 2	50	1000			
Receipts from debtors	225	4500	Payments to creditors	160	3200
Interest		165	Closing balance		2465
		8665			8665

Loan (bearing interest)

		Balance	100
		Interest	10
			110

Interest

Loan interest	10	Venture 1 (imputed interest)	135
		Venture 2 (imputed interest)	110
Capital	400	Interest received	165
	410		410

LEDGER 1 (cont.)

Profit and loss

	Int		*Int*
		Venture 1	65
Capital	255	Venture 2	190
	255		255

Capital

		Opening balance	4000
		Interest	400
		Profit	255
			4655

LEDGER 2

Venture 1

Opening stock	1750	Cash sales	2000
Cash purchases	1500	Credit sales	2500
Credit purchases	2050		
Profit and loss	200	Closing stock	1000
	5500		5500

Venture 2

Opening stock	1550	Cash sales	1000
Cash purchases	1500	Credit sales	2700
Credit purchases	1650		
Profit and loss	300	Closing stock	1300
	4600		4600

Creditors Control

Cash	3200	Opening balance	500
Closing balance	1000	Credit purchases	3700
	4200		4200

Debtors Control

Opening balance	300	Receipts from debtors	4500
Credit sales	5200	Closing balance	1000
	5500		5500

ABACUS, Vol. 24, No. 1, 1988

RONALD MA and ROGER HOPKINS

Goodwill—An Example of Puzzle-Solving in Accounting

The nature of goodwill continues to be misunderstood by most accountants and confusion surrounding the measurement and reporting of goodwill persists. The rejection of official accounting standards on goodwill is a common occurrence. A dynamic open system perspective is used in this paper to re-examine the nature of goodwill. It is found that a meaningful economic interpretation can be developed for internally generated goodwill but not for 'purchased goodwill'. There is an inability to identify the stream of benefits specifically associated with goodwill arising on acquisition.

Key words: Accounting policies; Goodwill; Historical cost accounting.

INTRODUCTION

In the mid-seventies writers such as Wells (1976) and the authors of the Statement on Accounting Theory and Theory Acceptance (American Accounting Association, 1977) found it useful to borrow from the work of Kuhn (1970) to provide a new perspective on developments in the accounting discipline. More recently Blaug (1980) has noted the important role of 'puzzle solving' in the Kuhnian view of the breakdown phase of 'scientific revolutions':

> [T]he old and new generations talk past each other as unsolved puzzles in the old framework become corroborating examples in the new; since there is always loss of content as well as gain, conversion to the new approach takes on the nature of a religious experience, involving a *Gestalt* switch; and as [the] new framework conquers, it becomes in turn the normal science of the next generation. (p. 31)

In accounting an example of a puzzle 'unsolved . . . in the old [historical cost] framework' is provided by the calculation and reporting of goodwill. The accounting treatment of goodwill is an issue of relevance to the current financial scene.[1] It is perhaps not too strong to assert that a sense of urgency prevails. There is not only a continuing level of activity in corporate mergers and takeovers coupled with the requirement in Australian Accounting Standard 18 (AAS, 1984) to recognize and

---

RONALD MA is Professor Emeritus, University of New South Wales, and ROGER HOPKINS is Professor of Accounting, National University of Singapore.

This is a revised version of a paper presented at the South-East Asian University Accounting Teachers' Conference held at the National University of Singapore, April 1986. The comments of Malcolm Miller and Mick White on that paper are acknowledged.

[1] Note the sustained takeover activities nationally and internationally of corporate raiders such as Holmes à Court of the Bell group, Elliott of the Elders IXL group, Brierley of Industrial Equity, and Spalvins of Adelaide Steamship, which typically lead to the recognition of goodwill in the group accounts. Reference to recent discussion of goodwill in the literature is given in footnote 11.

amortize goodwill on acquisition, but there is an impending review of *AAS 18* by the Accounting Standards Review Board (Killen, 1987).

The second section of this paper examines the nature of goodwill from a dynamic open systems perspective. The articulation of its nature does not, however, resolve the twin problems of measuring and reporting goodwill. The third section contains some concluding observations.

THE NATURE OF GOODWILL

Accountants have been writing about goodwill for a long time (e.g., Leake, 1914; Yang, 1927). More recent explanations and analyses of goodwill can be found in the writings of Gynther (1969), Lee (1971), Miller (1973) and Hendriksen (1982), among others. The purpose of this current endeavour is to further elucidate and illuminate the nature of this vexing and elusive element, not to reinvent the wheel.

Businessmen are not much concerned with the calculation of the goodwill of a company or firm in their everyday affairs. The problem arises only when it is desired to determine enterprise value on the eve of a change in ownership. There are two general situations in which this occurs. First, changes in the ownership pattern of a partnership take place when the profit-sharing ratios of existing partners are altered, an old partner retires, or a new partner is taken into the firm. In this situation the goodwill of the firm is usually determined according to some formula prescribed in the partnership agreement.

Second, the negotiation for the acquisition of a company or firm also requires businessmen to calculate enterprise value. Conventionally, goodwill is viewed as the capitalized value (i.e., the present value) of the future stream of superior earnings of the business to be acquired. The amount paid for goodwill will be agreed through a negotiation process, and is equal by definition to the excess of the purchase price paid for the business over the sum of the fair values of its identifiable tangible and intangible net assets (i.e., assets net of liabilities).[2] According to the Accounting Principles Board (APB No. 16, 1970), the 'fair value' of an acquired asset may be measured by the value of the consideration given or the value of the property acquired whichever is the more clearly evident. In this context and in this paper the term fair value is used broadly to refer to the market buying price of an asset at a point in time, that is, at the time of acquisition of a business. Under historical cost principles, where an acquisition has taken place, the fair value of the assets acquired from the viewpoint of the purchaser is their input value, that is, their cost at the time of acquisition. Where both the buyer and the seller are corporate entities, the *cost* of the goodwill arising from the acquisition is recorded as 'goodwill on consolidation' or 'excess of cost of investment in subsidiary over the net equity (or net assets) acquired' in the consolidated balance sheet.[3]

If it is assumed that the price paid for a firm over and above the fair value of its net assets is the purchaser's expectation of superior earnings, then, in order to understand the nature of goodwill it is necessary to go beyond the measurement issue to ask why superior earnings exist.

[2] All tangible assets and some intangible assets such as patents and trademarks, royalties, etc. are separately identifiable. Goodwill is intangible and not separately identifiable. It cannot exist of and by itself.

[3] Where the business acquired does not retain a separate identity, goodwill is seldom recorded in the purchaser's accounts. Presumably the total purchase price is arbitrarily assigned to the acquired assets.

The Firm as a Dynamic Open System

The use of an asset in combination with other assets is often assumed to lead to an interaction affecting favourably the productivity of the other assets as well as its own productivity. This is the so-called synergy from asset interaction, which results in superior earnings. Other interactions, for example, between the sub-systems of a firm or between a firm and its environment, also generate synergistic benefits, as explained below.

Miller (1973) views the firm as a dynamic system, a goal achieving entity, defined as 'a collection of functioning elements, such as the parts of an automobile engine, that work together as a unified whole because of the relationships among the elements of the system' (p. 281).

He argues (p. 282) that the traditional accounting practices of valuing individual assets and aggregating those values have a severely limited role in a systems context, citing Chamberlain (1968):

> The assets which are relevant are its real assets – not balance sheet abstractions but the operational realities of a product line, a production organization, a marketing organization, and a financial organization, all meshing together to produce a stream of revenues.

Importantly, the firm is an open system, as explained by Katz and Kahn (1969): 'Social organizations are flagrantly open systems in that the input of energies and the conversion of output into further energic input consist of transactions between the organization and its environment' (p. 89).

When the firm is viewed as a dynamic open system, it is evident that enterprise earnings may well exceed the normal return on an identifiable net assets investment base and enterprise value may exceed the total fair value of those net assets. When there is a need to identify and/or report enterprise value, it can be met within the historical cost system by the incorporation of goodwill as an asset within the formal accounting system of a firm. An understanding of the valuation of goodwill must, however, rest on an understanding of the nature of goodwill, whether it is internally generated or acquired.

The nature of goodwill is examined below under three situations: internally generated goodwill (g); goodwill on acquisition where the acquired company is expected to continue to operate as an autonomous entity (G_1); and goodwill on acquisition where the operations of the acquired company are wholly or partly integrated into those of the enlarged group (G_2).

Internally Generated Goodwill (g)

From the viewpoint of its shareholders, the value of a business enterprise, say company Y, as a going concern can be conceived as the present value of Y's expected future earnings stream,[4] discounted at the rate r_y which reflects the riskiness of that stream.[5] This enterprise value (V_y) can be analysed into the following components:

---

[4] Under certain limiting assumptions (i.e., perfect capital markets, rational behaviour, and perfect certainty) the discounted cash flow approach, the current earnings plus future investment opportunities approach, the stream-of-dividends approach, and the stream-of-earnings approach are equivalent approaches to share valuation (Miller and Modigliani, 1961).

1. The total fair value of Y's identifiable tangible and intangible net assets (NFV_y);[6]
2. The present value of expected synergistic benefits from the interaction of assets and other sub-systems of Y when Y is viewed as a dynamic system (s_1); and
3. The present value of expected synergistic benefits from the interaction of Y with its environment, when Y is viewed as an open system (s_2).

Internally generated goodwill (g) can be derived as the difference between V_y and NFV_y. It is also given by the sum of s_1 and s_2 (we can call this the first level of interaction), as shown below:

$$\begin{aligned} g &= V_y - NFV_y && (1) \\ &= s_1 + s_2 && (1a) \end{aligned}$$

Internally generated goodwill is economically meaningful, in the sense that the synergies s_1 and s_2 arise from, or are otherwise related to, the employment of Y's assets in its operations. It will be seen that this link between the synergies (which gives rise to goodwill) and the identifiable assets (whose fair value is used to derive the goodwill figure) is not always present in the case of goodwill on acquisition.

Derived as the difference between a subjective value (V_y) and an amount based on dated marked prices (NFV_y), g is itself a subjective value. Hence it cannot be part of any accounting framework which eschews the recording and reporting of subjective values.

Goodwill on Acquisition (G_1)

In accounting for goodwill on acquisition accountants typically treat the acquisition as though the acquired company is expected to remain operationally an autonomous entity (e.g., see Emery, 1951). Given homogeneous expectations on the part of the acquiror, say company X, and the acquired company, say company Y, as to the amount, timing and quality of the latter's future earnings, the acquisition price is likely to be equal to or close to V_y. Hence, the measure of G_1 will be equal to or approximate that of internally generated goodwill, g.

Specifically

$$\begin{aligned} G_1 &= p - NFV_y && (2) \\ &\approx V_y - NFV_y && (2a) \\ &\approx s_1 + s_2 && (2b) \end{aligned}$$

---

[5] The appropriate discount rate, in a capital asset pricing model context, is the expected rate of return, r_y, which is a function of the market risk of Y, B_y. B_y is described in the finance literature as the market or systematic risk of Y. It is a measure of the relative contribution of Y to the market portfolio, and is also interpreted as the sensitivity of Y's returns to changes in the market return. $r_y = r_f + B_y (r_m - r_f)$, where r_f is the risk-free rate and r_m is the expected rate of return on the market.

[6] As explained earlier, the term fair value is used to denote market prices. The issue of what constitutes an asset is not explored here and the reader is referred to the exchange between Larson and Schattke (1966, 1975), Chambers (1967, 1976), and Vickery (1975).

where p is the purchase price paid to acquire Y. The implicit assumption is that Y remains operationally an autonomous entity and does not interact in any way with X and no new synergies arise as a result of the acquisition. Thus the goodwill recorded on acquisition, G_1, can be given an economic interpretation similar to that for internally generated goodwill, g. Equation (2) represents the measurement of G_1 as recorded by the accountant. Equations (2a) and (2b) describe its economic interpretation and indicate the affinity of G_1 to g, given the assumptions stated above.

If the homogeneous expectations assumption is relaxed then p can differ markedly from V_y, and G_1 from g. This situation is explored in more detail in the following subsection.

Goodwill on Acquisition (G_2)

The implicit assumption that accountants usually adopt, that the acquired company's operations remain autonomous after acquisition, may often not hold in the current economic environment. More likely, post-acquisition inter-firm synergy will be present and earnings associated with the pre-acquisition operations of an acquired company can no longer be separately identified.

New synergistic effects can be distinguished on the acquisition or planned acquisition of a business enterprise. For illustration, suppose that a company, X, is negotiating for the purchase of another company, Y. From the viewpoint of Y, the minimum purchase price acceptable to its shareholders is V_y. From the viewpoint of the acquiring company, X, new synergies associated with the operations of the enlarged group after the acquisition of Y may be expected. The enlarged group can be designated XoY (where o is a mode of combination). The new synergies (we may call this the second level of interaction) can cause the purchase price to be struck above the minimum price, reflecting new benefits expected to be created by the acquisition:

1. The present value of synergistic benefits from the interaction of the assets and other sub-systems of Y with those of X (s_3);
2. The present value of synergistic benefits arising from the acquisition of Y, e.g., control of a source of supply or an outlet, diversification leading to a reduction in the risk of X's earnings,[7] etc. (s_4); and
3. The present value of synergistic benefits from the interaction of the enlarged group, XoY, with its environment (s_5).

The synergies at the two levels of interaction cannot be summed in any meaningful way, because synergies at this second level, that is, s_3 to s_5, may impinge upon and even supersede altogether those at the first level, that is s_1 and s_2. For example, suppose that sub-systems x' and x'' interact in company X's operations and similarly sub-systems y' and y'' interact in Y's operations. After the acquisition, new interactions generating new synergies may develop in the enlarged group, XoY, for example, x' interacting with y', and x'' with y''.

---

[7] It is believed by some financial economists that diversification bestows no benefits on shareholders, since they can diversify on their own account (Brealey and Myers, (1984)). Nonetheless, diversification may still be attractive to management and undiversified shareholders.

In particular, the interaction of XoY with its environment may confer incremental advantages or disadvantages on the group. For example, a larger group could have easier access to capital markets, but it might also encounter more difficult employee-relations and other control problems. Also, an enlarged group may violate (or be suspected of violating) anti-trust regulations.

Clearly, there is a different perspective on purchased goodwill when it is viewed from the vantage point of the acquiring company. A focal point is the determination of the purchase price.

Minimum and Maximum Price for the Acquisition of Y

In the previous sub-section it was suggested that the pre-acquisition value of company Y as a going concern is the sum of the fair values of Y's identifiable tangible and intangible net assets *plus* the present value of synergistic benefits at the so-called first level of interaction. Assuming there is agreement on predicted cash flows, the level of risk and the discount factor, this represents the minimum price for Y acceptable to the shareholders of Y. To accept less would be detrimental to Y's shareholders' wealth.

The maximum purchase price of Y acceptable to the prospective acquiror X is the capitalized value of an incremental stream, which amount can be derived as the difference between the capitalized value of the expected earnings of X (without the acquisition of Y) and that of XoY (with the acquisition). To pay more would be detrimental to X's shareholders' wealth. The expected earnings of X and XoY are predictions made by the prospective acquiror and the appropriate discount rates, r_x and r_{xoy}, are functions of the market risks of X and XoY respectively.[8]

The purchase price which is struck lies in a range between the minimum price and the maximum price (both inclusive). It depends partly on the relative bargaining skills of the buyer and the seller and partly on knowledge asymmetry. Where Y is not aware of X's expectations of the benefits from the acquisition, the agreed price will tend towards the minimum price, and where Y knows or is able to make a shrewd guess about X's expectations the agreed price may be forced up to the maximum price.

From the viewpoint of X the agreed purchase price, whether a minimum, maximum, or in-between price, is always a payment for the capitalized value of an expected incremental earnings stream (as explained above). Where there is little or no anticipated interaction between X and Y after the acquisition the spread between minimum price and the maximum price will be small, but this is an unlikely occurrence. Where interaction is anticipated, then the capitalized value of the incremental stream will exceed the capitalized value of Y's earnings, other things being equal.

Where the agreed purchase price is equal to the maximum price, then from the viewpoint of X it would have paid the full price for the capitalized value of the incremental stream given by the difference between expected earnings before and after the acquisition of Y. If the purchase price is less than the maximum price, X would have paid a bargain price for the capitalized value of the incremental stream. Of course, if the purchase price is equal to the minimum price then this is *the same amount* as the sum of the component values of identifiable net assets, certain unidentifiable intangible resources and synergies associated with Y's operations as a separate entity which, as we have seen, in turn is equal to the capitalized value of Y's earnings. But, where post-acquisition synergies are present, this purchase price is *not the same thing* as the value of Y as a unique and separate entity. The difference between the purchase price of Y and the total fair value of the net assets acquired (NFV_y) – the so-called goodwill on acquisition or consolidation – has been explained as simply a payment for the capitalized value of Y's expected superior earnings.

---

[8] r_x and r_{xoy} are obtained in a similar manner as r_y, as explained in footnote 5.

The correct relationship, that of the purchase price of Y to the incremental earnings stream (V_i below), may be explained as follows:[9]

Let p = *de facto* purchase price of Y;
V_x = capitalized value of X's expected earnings before the acquisition;
V_y = capitalized value of Y's expected earnings before the acquisition;
V_{xoy} = capitalized value of the enlarged group's (XoY) expected earnings;
V_i = capitalized value of the expected incremental earnings given by the difference between the expected earnings of XoY and of X
$= V_{xoy} - V_x$; and
d = discount on the maximum price, V; being a function of bargaining and knowledge asymmetry, expressed as a per cent.

$$p = (1 - d)\ V_i \tag{3}$$

where $0 < d \leqslant (V_i - V_y)/V_i,\ V_i > V_y$, then $V_i > p \geqslant V_y$;
$d = 0,\ V_i \geqslant V_y$, then $p = V_i$.

Can Goodwill on Acquisition, G_2, Be Meaningfully Interpreted?

In accounting practice goodwill on acquisition, G_2, is accounted for in exactly the same way as G_1, that is, as the difference between the purchase price, p, and the fair value of Y's net assets, NFV_y, at the time of acquisition.

Specifically

$$G_2 = p - NFV_y \tag{4}$$

Substituting (3), equation (4) can be expanded:

$$G_2 = (1 - d)\ V_i - NFV_y \tag{4a}$$

$$= (1 - d)\ (V_{xoy} - V_x) - NFV_y \tag{4b}$$

It is difficult to provide an economic interpretation of G_2 as described in (4b). First, as has been shown earlier, while the minimum and maximum purchase price depend on economic factors, the actual price is also a function of non-economic considerations such as relative bargaining skills and knowledge asymmetry.

---

[9] The completed purchase implies $V_i \geqslant V_y$ (see text immediately following for description of notation).

Second, the term V_y, that is, the capitalised value of Y's future earnings from its pre-acquisition operations is not present in (4a) and (4b). So far as the acquiror is concerned, the objective of the acquisition is not to purchase Y's *existing operations* (and, by extension, Y's existing assets on which those operations depended). The synergistic benefits in Y may not remain intact after the acquisition, rather synergies at the second level of interaction generated by the operations of the enlarged group XoY could contribute more significantly to the group's earnings. In the extreme case, all earnings previously generated by Y's operations may be displaced, as for example, when the role of Y as a sub-system in the enlarged group is radically different from its previous role as a separate entity. Indeed, the identifiable net assets of Y (whose values are represented by the second term on the RHS of (4)) might have been wholly or partly disposed of after acquisition or put to alternative uses.

Third, the way in which accountants record and report G_2 robs the measure of any economic significance. The acquisition cost of Y's assets are 'locked' into the G_2 measure (as seen in (4)) and subsequently amortized. As already noted, in the extreme case, these assets could have been disposed of soon after the acquisition.

THE VALUATION AND REPORTING OF GOODWILL

Normal Goodwill

The examination of goodwill from a dynamic open system perspective makes it possible to view goodwill as a product of the synergistic benefits generated by interactions of assets and other sub-systems within the firm and between the firm and its environment. However, the effective valuation and reporting of the capitalized value of the expected earnings flows associated with such activities clearly presents problems for accountants, specifically in the lack of identification of the flows with specific assets or entities. Attempts to solve these problems within the formal double entry framework have ranged from no recognition and hence no identification of flows in the case of internally generated goodwill, to a 'forced' identification of flows with the acquired entity in the case of goodwill arising on an acquisition.[10]

In the U.S. *APB Opinion No. 17—Intangible Assets* (1970) and in Australia *AAS 18—Accounting for Goodwill* (1984) require that goodwill on acquisition be recognized as an (intangible) asset and amortized over the period that will benefit from its acquisition (up to a specified number of years), but prohibit the recognition of internally generated goodwill. This inconsistency of treatment may be justified on the grounds that in the former case a price has been paid and a 'cost' can be recorded. Yet, as has been argued above, an economic interpretation can be given for internally generated goodwill. Despite that interpretation, accounting standards in accordance with GAAP forbid the recognition of this source of benefits since, it is argued, no asset acquisition has taken place. On the other hand, goodwill on acquisition does not admit of any simple economic explanation (in terms of a relationship to a defined stream of benefits), but accounting standards require its recognition as an intangible asset and subsequent amortization (required in the U.S. and Australia, and permitted in the U.K. and by the IASC). When there has been a transaction, it is convenient to recognise the excess of the acquisition cost of a business over the total fair value of net assets acquired as the cost of goodwill because there will otherwise be an 'unexplained difference'. But it can be argued that it is equally convenient to write-off the debit balance at the time of acquisition, either against reserves (the treatment preferred in the U.K. standard *SSAP 22 – Accounting for Goodwill* (1984) and permitted by the international standard *IAS 22 – Accounting for Business Combinations* (1984)) or against income (although this latter treatment is not permitted under any accounting standard).[11]

---

[10] Of course, in this case, the recording and reporting issues arise only when the consolidated accounts of a holding company are prepared.

Two points need to be raised. Since goodwill on acquisition and internally generated goodwill sometimes represent benefits with similar risk characteristics, it can be argued that under these circumstances they should be accounted for in the same way. Second, where it is not possible to give any meaningful economic interpretation to goodwill on acquisition, that is, it is not the present value of a defined stream of benefits, its systematic amortization is difficult to justify.

'Negative' Goodwill

'Negative' goodwill is a contradiction of terms, implying the existence of negative synergy and hence one may expect to find the accounting treatment of negative goodwill fraught with difficulties. Negative goodwill arises where the fair value of the net assets acquired exceeds the purchase price. *APB Opinion No. 16 – Business Combinations* (1970) argues that net assets cannot be valued above acquisition cost, and requires that the difference be allocated proportionately against the fair value of non-current assets, excepting long-term listed (that is, quoted) securities, in determining their fair values. If these values are reduced to zero, the balance of the credit difference is to be recorded as a deferred credit, and systematically amortized (credited) to income over a period expected to benefit from the acquisition, up to a specified number of years. Some accountants may find the American treatment extreme, as it refuses to recognize any gain at the time of acquisition even after conservative write-downs, but may be forced to recognize an 'unrealized gain' in instalments in the income statement over an extended period.

SSAP 22 requires negative goodwill to be credited directly to reserves. The difference is regarded as a bargain purchase, that is a capital gain has been made. Although in the past this was also the practice in Australia, *AAS 18* currently requires the difference to be allocated proportionately against the fair values of non-monetary assets acquired. If a credit balance remains after non-monetary assets have been written down to zero, it is to be classified as a gain and taken to the profit and loss account. While the requirements in *AAS 18* are not as extreme as those in *APB Opinion No. 16*, the same criticism applies to both standards. It is difficult to justify the write down of assets measured at fair value.

---

[11] Interestingly, *AAS 18*, has not been complied with by a number of large companies in Australia. For example, Peko-Wallsend in its 1986 accounts wrote off goodwill on acquisition against retained profits, while Humes and Coles Myer wrote off goodwill as an extraordinary item in the profit and loss account (Munton, 1987). Casual observation indicates that many other companies have failed to comply with the requirements of *AAS 18*, and this is supported by evidence provided by Kirkness (1987, p. 51).

Not unexpectedly, the international accounting standard *IAS 22* is relatively permissive in respect of negative goodwill, with diverse national practices given due recognition.

In accounting for goodwill practically all conceivable alternatives would appear to be either required or condoned by one or other of the accounting standards examined above. This outcome attests to the ill-defined nature of the principles underlying historical cost accounting.

CONCLUSION

The problems surrounding the measurement and reporting of goodwill are serious and pressing,[12] and they are compounded because the nature of goodwill appears to have not been understood properly by accountants. A rigid commitment in accounting to the cost doctrine and transaction based recording has resulted in a puzzling paradox: *Non-recognition* of internally generated goodwill, which has a meaningful economic interpretation but is *not* recognized, while goodwill on acquisition *is* recognized although, as recorded by accountants, it cannot be interpreted meaningfully and is not identifiable with a specific source. By choosing to identify this latter category of goodwill exclusively with the purchased entity, accountants have opted for convenience rather than reality. The manifest danger is the practice of Alice-in-Wonderland accounting, which will lead inescapably to a loss of professional credibility in the business community.

The review in this paper suggests that the search for a correct method of recording and amortizing goodwill within the historical cost framework is unlikely to succeed. Perhaps it is a sense of the futility of this capitalization/amortization approach that is the reality behind the actions of a number of large companies noted earlier who have opted for an immediate write-off of goodwill on acquisition.[13] At least their actions are consistent with the non-recognition of internally generated goodwill.

REFERENCES

Accounting Principles Board, *APB Opinion No. 16—Business Combinations, 1970.*

——, *APB Opinion No. 17—Intangible Assets,* 1970.

Accounting Standards Committee, *SSAP 22—Accounting for Goodwill,* 1984.

——, *SSAP 14—Group Accounts,* 1987.

American Accounting Association, *Statement on Accounting Theory and Theory Acceptance* AAA, 1977.

Australian Society of Accountants and the Institute of Chartered Accountants in Australia, *AAS 18—Accounting for Goodwill,* 1984.

Blaug, M., *The Methodology of Economics,* Cambridge University Press, 1980.

---

[12] According to Killen (1987), the Chairman of the Accounting Standards Review Board has commented: 'Goodwill is becoming a burning issue. We have only a short time to let the consolidation standard run before we will have to address goodwill'.

[13] See footnote 11. Presumably these companies do not intend to indulge in the practice which has been noted in the New Zealand context, namely, buying an investment, writing-off the goodwill on acquisition (wholly or partially) against reserves, and then selling the investment at approximately the same price to realize a gain on sale to the extent of the amount of goodwill written off to reserve. The goodwill write-off is not reversed from the reserve account at the time of sale (Carslaw, 1986).

Brealey, R., and S. Myers, *Principles of Corporate Finance* (2nd edn), McGraw-Hill, 1984.

Carslaw, C., 'Goodwill-Anything Goes', *The Accountant's Journal*, August 1986.

Chamberlain, N. W., *Enterprise and Environment*, McGraw-Hill, 1968.

Chambers, R. J., 'Continuously Contemporary Accounting – Additivity and Action', *The Accounting Review*, October 1967.

———, 'Whatever Happened to CCE?', *The Accounting Review*, April 1976.

Emery, K. G., 'Should Goodwill be Written Off', *The Accounting Review*, October 1951.

Gynther, R. S., 'Some Conceptualizing on Goodwill', *The Accounting Review*, April 1969.

Hendriksen, E. S., *Accounting Theory*, Irwin, 1982.

International Accounting Standards Committee, *IAS 22 – Accounting for Business Combinations*, 1984.

Katz, D., and R. L. Kahn, 'Common Characteristics of Open Systems', in F. E. Emery (ed.), *Systems Thinking*, Penguin Books, 1969.

Killen, H., 'Accounting Board Hopes to Pick Up the Pace', *The Australian Financial Review*, 19 January 1987.

Kirkness, J., 'The Impact of AAS 18', *The Chartered Accountant in Australia*, December 1987.

Kuhn, T. S., *The Structure of Scientific Revolutions*, University of Chicago Press, 1970.

Larson, K., and R. W. Schattke, 'Current Cash Equivalent, Additivity, and Financial Action', *The Accounting Review*, October 1966.

———, 'A Note on Vickery's Comment', *The Accounting Review*, January 1975.

Leake, P. D., 'Goodwill: Its Nature and How to Value It', *The Accountant*, 17 January 1914.

Lee, T. A., 'Goodwill: An Example of Will-O'-the-Wisp Accounting', *Accounting and Business Research*, Autumn 1971.

Miller, M. C., 'Goodwill – An Aggregation Issue', *The Accounting Review*, April 1973.

Miller, M. H., and F. Modigliani, 'Dividend Policy, Growth, and the Valuation of Shares', *Journal of Business*, October 1961.

Munton, J., 'Top Companies Ignoring Requirement for Goodwill', *The Australian Financial Review*, 14 January 1987.

Wells, M. C., 'A Revolution in Accounting Thought', *The Accounting Review*, July 1976.

Vickery, D. W., 'A Comment on the Larson-Schattke and Chambers Debate over the Additivity of CCE', *The Accounting Review*, January 1975.

Yang, J. M., *Goodwill and Other Intangibles*, Ronald Press, 1927.

ABACUS, Vol. 24, No. 1, 1988

IAN A. M. FRASER

Deprival Value or Value to the Owner? — A Clarification

A critical examination of the asset valuation concepts of value to the owner and deprival value. It is argued that these concepts are not synonymous but are, indeed, totally disparate. Specifically, replacement cost is *not* a measure of value to the owner.

Key words: Accounting theory; Financial statements; Replacement costs.

The concept of 'deprival value' or 'value to the owner', based on Bonbright's seminal work (1937), remains firmly entrenched within financial accounting theory despite substantial criticism (e.g., Chambers, 1971; Yoshida, 1973; Bromwich, 1977; and Ashton, 1987).[1] Further, the concept is an integral element of the professional approach to the problem of changing prices in several countries including the United Kingdom from Sandilands through ED 18 to ED 24 and SSAP 16 (1980),[2] the United States in FASB Statement 33 (1979), Australia in SAP 1 (1983), and New Zealand in CCA-1 (1982). 'Deprival value' and 'value to the owner' are generally, although not exclusively, regarded as synonymous by both accounting theorists and popular textbook writers. This is not surprising, perhaps, since emphasis is often placed upon Bonbright's definition which emphasized the latter term although the context was compensation for asset deprivation: 'The Value of a Property to it Owner is Identical in Amount with the Adverse Value of the Entire Loss, Direct and Indirect, That the Owner Might Expect to Suffer If He Were to Be Deprived of the Property' (p. 71).

The two concepts are distinguished, however, by MacDonald (1974): 'The first [i.e., "deprival value"] is applicable to an owner who has lost an asset and measures the quantum of the loss; the second [i.e., "value to the owner"] applies to an owner in possession of an asset' (p. 269).

Chambers (1971) *implies* this dichotomy although he does not make it explicit. This note argues that the two concepts are not only distinct but totally disparate and that 'deprival value', as usually calculated, is *not* a measure of 'value to the owner'. Specifically, replacement cost is not a measure of 'value to the owner'.

Criticisms of the transfer of Bonbright's ideas from a legal and compensatory context to an accounting one are well known (e.g., Chambers, 1971; Clark, 1984,

---

[1] Ashton's (1987) review and critique of value to the owner is expanded on in this article where the issue of whether RC is a measure of value to the owner is addressed.

[2] ED 24 and SSAP 16 abandoned the attempt to measure discounted present value but still adhered in essence to deprival value philosophy. The Australian and New Zealand positions are broadly similar.

IAN FRASER is a Lecturer in the Department of Accounting and Finance, University of Strathclyde, Scotland.

pp. 98-102) and are not repeated here. It is, however, worth recalling Chambers' point (1971, p. 66) that Bonbright appeared to indicate that 'value to the owner' might take the form of a variety of measures, including replacement cost or net realizable value or some amount between those two figures, or the lower of capitalized income and a derivative of replacement cost.

However, Bonbright may not have been as vague as Chambers' catalogue indicates; careful study of his text brings out Bonbright's view that 'value to the owner' was *in principle* not measurable by market values whether these take the form of either buying or selling prices. For instance:

> [This] very characteristic of market value means that the concept has but a limited usefulness in the valuation of property. [p. 66]
>
> The essential distinction between value to the owner and market value is that the former represents a state of mind, a favorable attitude of a particular person or group of persons toward the thing valued. [p. 67]
>
> . . . market value may be a fairer basis than would value to the owner, even if the latter could be estimated with equal accuracy and convenience. [p. 67]

These extracts indicate that Bonbright did not, *in principle*, equate 'value to the owner' with market values but that in certain circumstances market values might be a necessary, or even a more desirable, alternative. The adoption of market values as a surrogate, however, contrasts with 'Bonbright-derived' deprival value where 'value to the owner' is *defined* as RC or NRV in five cases out of six on the usual inequality basis (e.g., Solomons, 1966; Whittington, 1983, p. 132).

Why this discrepancy? The answer lies in a careful re-examination of Bonbright's definition. Bonbright said that value to the owner 'is Identical . . . with the Adverse Value of the Entire Loss, *Direct and Indirect*, That the Owner Might Expect to Suffer . . .' (p. 71, my emphasis).

However, the calculation of 'deprival value' along the usual lines generally ignores the *indirect* loss which, in a case where 'deprival value' is RC, may be taken as the excess of the greater of PV or NRV *over* RC. Bonbright did indicate that *on grounds of expediency* this indirect loss might be ignored:

> From a practical standpoint, this legal notion of a value that is measured merely by the more direct and standardized losses which an owner would suffer if he were deprived of the property, may be quite justified . . . But these practical considerations, persuasive as they may be, in no way impair the force of the statement that the true value of any property to its owner necessarily takes account of all the direct and indirect advantages that the property affords its owner, in the way of saving him from all forms of loss, direct and indirect, 'proximate' and 'remote'. (1937, p. 73)

and hence, 'there are situations under which a court is quite justified in valuing property, "for the purposes of the case", at an amount which concededly does not measure "value" in any accurate sense of the term' (1937, p. 77).

Bonbright, therefore, distinguished between his concept of 'value to the owner' and what might be objectively awarded by way of compensation for loss in a court of law:

> Replaceable property is therefore frequently assumed to be worth its replacement cost, because the owner might be impelled to replace it, were he deprived of its use. But the fact that the owner may also suffer important incidental losses, which he cannot avoid by replacing the property, is not always taken into account in an appraisal. It *should*, however, be taken into account if the objective is to find the full value of the property to its owner. (1937, p. 93, original emphasis)

Those, however, who see themselves as the intellectual descendants of Bonbright, including Baxter (1967, 1971, 1975), Edey (1974), and Parker and Harcourt (1969), have elevated Bonbright's pragmatic suggestion for compensatory judgments into a guiding principle for asset valuation. Certainly there is little justification to be found in Bonbright for arguing that, in general, value to the owner is given *in principle* by market price; specifically RC. The nearest Bonbright seems to get to this is when he says:

> Property is also ordinarily worth little more to its owner than the price at which the owner could quickly replace it with an equally desirable substitute, although the exceptions to this rule are numerous. (1937, p. 94)

This is, however, very different from saying that value to the owner *is* RC and, indeed, looks remarkably like the well-known principle that in near perfectly competitive markets the PV of an asset will tend to approximate its RC, and its selling price.

Thus Bonbright may be less confused than suggested by Chambers[3]; the different measures of value to the owner highlighted by Chambers must be understood in the context of the practical problem of assessing compensation for loss. The fundamental point is that 'pure' value to the owner is a *benefit* measure; however, in an uncertain world it will generally be the case that:

> value [i.e., benefit] is inherently limited to an ordinal scale because it is a personal preference based on personal predictions . . . Therefore, we must find a substitute or surrogate for value. Sacrifice can be measured cardinally and such a measure would increase the usefulness of the value measure because of the generality of the sacrifice measure. (Sterling, 1970, p. 124)

Thus 'value to the owner' embracing 'the entire loss, direct and indirect' is a *benefit* measure; owing to the difficulty of measuring the *indirect* loss, however, we may have to make do with replacement cost which measures the *direct* loss only.

Replacement cost is a sacrifice and even at the time of purchase will not generally represent the entire value to the owner except under conditions of perfectly competitive equilibrium and complete markets or in the case of the marginal unit of purchase. Under conditions of incomplete markets and imperfect competition it will measure only the *direct* consequences of loss or benefits of ownership for a replaceable asset. As a result, the indirect consequences of loss of benefits of ownership have been ignored by those who have developed Bonbright's ideas for use in accounting—or at least in those cases (the majority) where deprival value is given by RC.

The fundamental problem is not just therefore, as is sometimes asserted, that valuation for accounting purposes has to do with the valuation of assets which owners possess, and contrary to the deprival value formulation, do not expect to lose. That may be part of the problem. Bonbright himself pointed out, however, that although his own definition of value to the owner was the obverse of the usual formulation, there was a 'quantitative identity' between the two approaches (1937, p. 72). The positive and negative formulations are indeed identical in essence and the direct and indirect elements are taken into account in both. However, the vital point is that the advocates of deprival value have simply ignored the indirect element of the loss, where NRV or PV exceeds RC, and concentrated on the direct element only, that is, what it would cost to reinstate the asset.

---

[3] Incidentally, it is not true that Bonbright misunderstands the nature of financial statements as Chambers (1971, p. 63) suggests since Bonbright states 'the sum total of the value placed upon assets by the conventional balance sheet does not ordinarily measure, even roughly, either what the entire enterprise is worth to its security holders, or its sale value' (p. 79). Thus Bonbright did *not* believe, as implied by Chambers, that the sum of the values of assets was equal to the value of an enterprise as a whole.

Even the exponents of deprival value appear to have reservations at times about equating value to the owner with what one would have to pay in order to reacquire the asset in the event of loss.

For instance Edey (1974) justifies replacement cost as a measure of deprival value or value to the owner on the grounds, at least partially, that: 'Under competitive conditions the present value of the cash flow contributed by the asset is unlikely for long to exceed its replacement cost' (p. 77). Therefore:

> Calculation of the cost of hypothetical replacement can thus be regarded as part of the process of estimating the future cash flow and present value of the asset: *in the end it is these [cash flows], and these alone, that determine the usefulness of the asset, and therefore its financial worth, in the management's eyes.* (p. 78, emphasis added)

CONCLUSION

The concept of value to the owner as understood by Bonbright has been misinterpreted by those who see themselves as his intellectual descendants. Similarly, the linking of Bonbright's name with the deprival value derivation, in the familiar inequality form which appears in many textbooks, is inappropriate. In particular, RC is *not* a measure of 'value to the owner' as the term was used by Bonbright.

REFERENCES

Ashton, R. K., 'Value to the Owner: A Review and Critique', *Abacus*, March 1987.

Baxter, W. T., 'Accounting Values: Sale Price Versus Replacement Cost', *Journal of Accounting Research*, Autumn 1967.

———, *Depreciation*, Sweet and Maxwell, 1971.

———, *Accounting Values and Inflation*, McGraw-Hill, 1975.

Bonbright, J. C., *Valuation of Property*, McGraw-Hill, 1937.

Bromwich, M., 'The General Validity of Certain "Current" Value Asset Valuation Bases', *Accounting and Business Research*, Autumn 1977.

Chambers, R. J., 'Value to the Owner', *Abacus*, June 1971.

Clarke, F. L., 'Price Variation Accounting: The Insouciance of Professional Prescription', in M. J. R. Gaffikin, (ed.), *Contemporary Accounting Thought*, Prentice-Hall of Australia, 1984.

Edey, H. C., 'Deprival Value and Financial Accounting', in H. C. Edey and B. S. Yamey (eds), *Debits, Credits, Finance and Profits*, Sweet and Maxwell, 1974.

MacDonald, G., 'Deprival Value: Its Use and Abuse', *Accounting and Business Research*, Autumn 1974.

Parker, R. H., and G. C. Harcourt, *Readings in the Concept and Measurement of Income*, Cambridge University Press, 1969.

Solomons, D., 'Economic and Accounting Concepts of Cost and Value', in M. Backer (ed.), *Modern Accounting Theory*, Prentice-Hall 1966.

Sterling, R. R., *Theory of the Measurement of Enterprise Income*, University Press of Kansas, 1970.

Whittington, G., *Inflation Accounting: An Introduction to the Debate*, Cambridge University Press, 1983.

Yoshida, H., 'Value to the Firm and the Asset Measurement Problem', *Abacus*, June 1973.

ABACUS, Vol. 24, No. 1, 1988

ROBERT C. REEVE and PATRICK J. HUTCHINSON

The Contribution of Non-U.S. Institutions to Academic Accounting Journals

This study uses the weightings of accounting journal quality derived by Howard and Nikolai (HN, 1983) to produce a ranked list of the publishing contribution of the twenty-five top non-U.S. institutions for the ten-year period 1977-86. A data base was created of all the contributions by non-U.S. academics to the ten academic accounting and finance journals ranked highest in the HN study. The results of the analyses of this data base indicate: (a) the contribution of non-U.S. countries to the accounting and finance literature; (b) the proportion of publications accounted for by the top twenty-five non-U.S. institutions; and (c) a ranking of the contributions of the top twenty-five non-U.S. institutions.

Key words: Journals; Publications.

INTRODUCTION

Publication in scholarly journals is a relatively objective measure of research contribution. It is also one for which there is general consensus among faculty members and between faculty and administrators (Chan, 1978). It is widely used by academic institutions when making appointment, tenure, promotion and other resource allocation decisions (Beard, Jacobs and Hartgraves, 1985; Campbell and Morgan, 1986). It is used by individual academics when making career choices and by students, particularly postgraduate students, when making educational choices (Bazley and Nikolai, 1975). It is also used by government and other funding bodies in allocating resources (Bublitz and Kee, 1984; Groves and Perks, 1985).

Published studies have analysed and ranked the publication output of accounting departments (Bazley and Nikolai, 1975; Andrews and McKenzie, 1978; Windal, 1981; Brown and Gardner, 1985; Dyl and Lilly, 1985), as well as used the perceptions of accounting faculty members to develop rankings of journals (Benjamin and Brenner, 1974; Howard and Nikolai, 1983; Houghton and Bell, 1984; Nobes, 1985).

This paper reports the results of a study which combines and extends features of those studies to produce the first ranking of the top twenty-five non-U.S. academic

---

Robert C. Reeve and Patrick J. Hutchinson are Senior Lecturers in the Department of Accounting and Financial Management at the University of New England, Armidale, N.S.W., Australia.

The authors wish to acknowledge the helpful comments of participants at workshops held at the University of New England and Macquarie University in Australia and at the Universities of Birmingham, Manchester, and Sheffield in England.

institutions based on a weighted measure of their faculty members' contributions to ten 'top' accounting and finance journals over the period 1977 to 1986.[1]

The extensions embodied in this study are as follows. First, the emphasis on U.S. institutions in previous studies has been reversed. In this study the contribution of U.S. institutions is considered only in the aggregate for purposes of perspective. Only non-U.S. institutions are considered individually. Second, both accounting and finance journals have been included. In institutions outside the U.S.A., including those in the U.K., Australia and New Zealand, accounting and finance disciplines are typically located in a single department. Only scholarly/academic journals (Hendrickson, 1980) have been included to avoid, as far as possible, country-specific practitioner issues. The selection of the ten journals has been based on the most rigorous journal evaluation study available, by Howard and Nikolai (HN, 1983). Third, the period covered is long enough to allow for fluctuations in individual institutions' contributions and is also as up to date as possible, given the delays in publication of certain journal issues.[2]

Since only the total contributions of institutions are reported and no account is taken of faculty size, the study is limited. However, the main purpose of the study was to establish institutional contributions to the accounting and finance literature, rather than to assess institutional productivity on a per-faculty-member basis.

Reliable figures on effective institutional faculty sizes are difficult to obtain. Even when staff lists are available for accounting departments or membership of associations such as the AAANZ, not all accounting authors are in accounting departments (many are in business/management/commerce departments) and not all accounting authors are members of professional associations. Also the treatment of part-time and visiting staff is problematic as such staff are not consistently included in staff lists. Finally, there are inconsistencies in the availability of information on accounting staff between countries. For these reasons it was decided to report only the absolute size of contributions.

METHOD

A data base was created of all contributions by non-U.S. academics to the ten 'top' accounting and finance journals for the ten years 1977 to 1986. The ten top accounting and finance journals were derived from the list developed by Howard and Nikolai (1983) by including only academic journals specializing in accounting and/or finance. This resulted in the following journals being included, in rank order, with the HN rankings and weightings indicated in brackets:

1. *The Journal of Accounting Research* (HN 1, 176.7);
2. *The Accounting Review* (HN 2, 166.9);
3. *Journal of Finance* (HN 3, 154.3);

---

[1] The criteria for selecting the 'top' journals are obviously subjective.

[2] In September 1987 the most recent issue of the *International Journal of Accounting, Education and Research* available was Fall 1984. For all other journals, except for the *Journal of Accounting, Auditing, and Finance*, which began publication in 1978, the complete series, 1977-86, was available and included in the database.

4. *Journal of Financial and Quantitative Analysis* (HN 4, 144.4);
5. *Accounting, Organizations and Society* (HN 9, 110.1);
6. *Journal of Business Finance and Accounting* (HN 10, 105.8);
7. *Abacus*, (HN 15, 99.3);
8. *Journal of Accounting, Auditing and Finance* (HN 16, 96.8);
9. *Accounting and Business Research* (HN 21, 85.4); and
10. *International Journal of Accounting, Education and Research* (HN 22, 84.1).

Contributions were measured on the basis of the institutional affiliation(s) given by the author(s) with equal fractional credit being allocated for jointly-authored work. An unweighted aggregate was established for each institution for the period 1977-86. The contributions were then weighted by the HN values given above, transformed from percentages to decimal fractions, and then aggregated for each institution for the same period. This enabled rankings to be made of all non-U.S. institutions with any affiliated author publishing in the ten selected journals in that period.

An alternative weighting to the HN scheme used in this study was developed by Nobes (1985) from a survey of British, Australian, and New Zealand academics. The HN weighting was preferred for the purposes of this study because it was believed more objective to evaluate non-U.S. contributions using a weighting scheme derived from U.S. accounting academics, rather than from a subset of the non-U.S. accounting academics. It also reflects the reality that the academic accounting and finance area is dominated by U.S. authors whose opinions therefore provide the dominant perception of journal quality. In order to check the sensitivity of the rankings to the different weighting schemes a Spearman Rank correlation was computed between the ranking of the top twenty-five institutions based on the HN scheme and the top twenty-five institutions based on the Nobes scheme. The correlation coefficient was .968 (significant at .001). Only one additional institution appeared on the list derived using Nobes' scheme.

RESULTS

In the period 1977-86, 4,094 articles were published in the HN top-ten accounting journals. Of this total, 1,175 (29%) were by authors from 216 non-U.S. institutions, having a weighted value of 1,365 when the HN weightings are applied. Of this HN-weighted value of publications from non-U.S. institutions, those from the U.K. accounted for the highest proportion (36%), followed by Canada (26%), Australia and New Zealand (18%), and Israel (9%). Of the 216 non-U.S. institutions, the twenty-five listed in Table 1 account for more than half the total number (53%) of publications and 56 per cent of the HN-weighted value of publications.

Table 1 shows the ranking of the top twenty-five non-U.S. institutions based on HN-weighted publications. Along with the weighted rankings are given the weighted number of publications, the unweighted number of publications, and the unweighted ranking. Institutions with weighted publication scores greater than their unweighted publication scores had authors who contributed more to the more highly rated journals and vice versa.

TABLE 1
INSTITUTIONAL CONTRIBUTIONS 1977-86

Institution	*Country/ region**	*HN weighted publications*	*Rank*	*Unweighted publications*	*Rank*
British Columbia	CN	78.63	1	52.25	1
Hebrew, Jerusalem	IS	59.68	2	42.66	3
Toronto	CN	56.26	3	39.41	5
Lancaster	UK	52.85	4	50.83	2
New South Wales	AU	50.51	5	42.00	4
Tel-Aviv	IS	48.14	6	33.16	6
Manchester	UK	34.43	7	32.17	7
London Business School	UK	31.92	8	25.13	9
McGill	CN	31.27	9	25.00	10
Sydney	AU	28.43	10	27.33	8
York	CN	24.61	11	17.92	17
Macquarie	AU	23.55	12	21.08	11
Alberta	CN	23.33	13	17.67	18
McMaster	CN	21.84	14	14.42	24
LSE**	UK	21.21	15	20.50	12
Monash	AU	19.18	16	18.67	14
Ottawa	CN	18.44	17	14.67	21
Nottingham	UK	18.42	18	18.00	16
Edinburgh	UK	17.76	19	18.83	13
Birmingham	UK	17.38	20	17.50	19
Wellington	NZ	17.35	21	14.00	25
Bristol	UK	17.16	22	18.50	15
Sheffield	UK	15.68	23	14.83	20
Simon Fraser	CN	15.46	24	10.50	35
Strathclyde	UK	14.45	25	14.50	22
Totals		757.94		621.53	

* Canada is abbreviated as CN, the United Kingdom as UK, Israel as IS, Australia as AU and New Zealand as NZ.

** London School of Economics and Political Science.

From Table 1, the University of British Columbia is the top non-U.S. institution both in terms of unweighted publications and in terms of weighted publications. Of the top twenty-five institutions, ten were from the U.K., eight from Canada, five from Australia and New Zealand, and two from Israel. With the notable exception of Israel, there are no institutions from non-English speaking countries, nor any non-university institutions in the top twenty-five non-U.S. institutions.

Finally, the results can be used to assess the top locations in terms of publishing institutions by aggregating the weighted publication scores for institutions within the same city. This should prove useful, for example, for academics planning sabbatical leave. On this basis Sydney, Australia, has the highest score of 102 made up of scores from the University of New South Wales, the University of Sydney and Macquarie University. Vancouver, Canada, is second with a score of 94 made up of scores from the University of British Columbia and Simon Fraser University. London, England, is third with a combined score of 53 for the London Business School and the London School of Economics.

SUMMARY AND CONCLUSIONS

The above results provide the first comprehensive ranking of non-U.S. institutions based on the criterion of publications in the ten top accounting and finance journals.

Academics affiliated to U.S. institutions dominate the ten top accounting and finance journals. The major non-U.S. contributors to the ten top accounting and finance journals are the British, Canadians, and Australians. The British contribute the largest proportion of articles (36%), the Canadians have the top-ranked institution (University of British Columbia), and the Australians have the highest concentration of publishing authors in one location outside the U.S.A. (Sydney). The top twenty-five institutions account for over 50 per cent of the publications by authors at non-U.S. institutions. The composition and ranking of the top twenty-five non-U.S. institutions were not significantly changed by using an alternative weighting scheme.

REFERENCES

Andrews, W. T., and P. B. McKenzie, 'Leading Accounting Departments Revisited', *The Accounting Review*, January 1978.

Bazley, J. D., and L. A. Nikolai, 'A Comparison of Published Accounting Research and Qualities of Accounting Faculty and Doctoral Programs', *The Accounting Review*, July 1975.

Beard, L. H., F. A. Jacobs and A. L. Hartgraves, 'Publications: A Valid Measure of Faculty Performance?', *Journal of Accounting Education*, Fall 1985.

Benjamin, J. J., and V. C. Brenner, 'Perceptions of Journal Quality', *The Accounting Review*, April 1974.

Brown, L. D., and J. C. Gardner, 'Using Citation Analysis to Assess the Impact of Journals and Articles on Contemporary Accounting Research (CAR)', *Journal of Accounting Research*, Spring 1985.

Bublitz, B., and R. Kee, 'Measures of Research Productivity', *Issues in Accounting Education*, 1984.

Campbell, D. R., and R. G. Morgan, 'Publication Activity of Promoted Accounting Faculty', paper presented at the American Accounting Association National Conference, 1986.

Chan, J. L., 'Organizational Consensus Regarding the Relative Importance of Research Output Indicators', *The Accounting Review*, April 1978.

Dyl, E. A., and M. S. Lilly, 'A Note on Institutional Contributions to the Accounting Literature', *Accounting, Organizations and Society*, 10(2), 1985.

Groves, R. E. V., and R. W. Perks, 'The Teaching and Researching of Accounting in UK Universities: A Survey', *The British Accounting Review*, 1985.

Hendrickson, H. S., 'Journals for Accountants', *The Accounting Review*, October 1980.

Houghton, K. A., and R. Bell, 'Evaluations of Accounting and Finance Journals: The Australian View', *The International Journal of Accounting Education and Research*, Fall 1984.

Howard, T. P., and L. A. Nikolai, 'Attitude Measurement and Perceptions of Accounting Faculty Publication Outlets', *The Accounting Review*, October 1983.

Nobes, C. W., 'International Variations in Perceptions of Accounting Journals', *The Accounting Review*, October 1985.

Windal, F. W., 'Publishing for a Varied Public: An Empirical Study', *The Accounting Review*, July 1981.

ABACUS

A Journal of Accounting and Business Studies

Volume 24 **Number 2** **September 1988**

Wisdom or Widgets: Whither the School of 'Business'?
Dan Subotnik

Evolution of a Lease Solution
G. H. Burrows

Knowledge Preservation in Accounting: A Citational Study
Robert J. Bricker

Auditors' Responsibilities for Events Arising After Balance Date
Donald J. Stokes and Graham G. Sullivan

Changes in Task Uncertainty Induced by Zero-Base Budgeting:
Using the Thompson and Hirst Models to Predict Dysfunctional Behaviour
Randall B. Hayes and William R. Cron

Intuitive Choice of Cooperative Sharing Mechanisms for Joint Cost Savings:
Some Empirical Results
Thomas L. Barton

Capital Maintenance Adjustment Under the Financial (Real) Capital Concept
Denis J. Pratt

THE UNIVERSITY OF SYDNEY

ACCOUNTING AND FINANCE FOUNDATION

ABACUS

A Journal of Accounting and Business Studies

Style Guide to Contributors

1. Submit two copies of manuscript.
2. Use opaque quarto paper (207 mm × 260 mm) or A4 (210 mm × 297 mm); double space text; leave adequate (30 mm) margins on both sides.
3. Place name of author in BLOCK capitals above the title of the article. Give author's present position at the foot of the first page, as in this issue.
4. Use footnotes sparingly. Place them at the end of the manuscript, double spaced with an extra line between entries. Number footnotes consecutively throughout the text; use superior numbering without point, thus: '. . . money'.[3] Cite books and articles in the text thus: . . . (Jones, 1962, p. 21).

   For page reference numbers use p. 21, pp. 423-32, pp. 406-571, but pp. 11-13, pp. 115-19.
5. List books and articles cited in alphabetical order at the end of the manuscript. When listing books and articles use the following forms respectively:

   Jones, A., *Depreciation of Assets*, Publisher & Co., 1962.

   Morrisey, Leonard, 'Intangible Costs' in Morton Backer (ed.), *Modern Accounting Theory*, Prentice-Hall, 1966.

   Revsine, L. and J. Weygandt, 'Accounting for Inflation: The Controversy', *Journal of Accountancy*, October 1974.

   Smith, B., 'An Aspect of Depreciation', *The Journal of Accounting,* August 1965.

   Do not use brackets; use short titles for publishers unless it is essential to tracing.
6. Underline what is to be printed in italics. Use BLOCK capitals only for what is to be printed in capitals. Use italics and BLOCK capitals sparingly. Use the smallest number of styles for section headings; preferably side headings, in italics.
7. For quotations within the text use only single quotation marks, and double marks for quotes within quotes. Where quotations exceed four lines inset quoted material three spaces, but do not use quotation marks.
8. Do not use a point in standard abbreviations such as CPA, SEC, but use points in U.K., U.S.A., and similar abbreviations. Date style e.g. 19 February 1966.
9. Use double dashes (–) to indicate dashes in the text, single dashes (-) for hyphens.
10. Use 'z' for such words as capitalize; 's' for the smaller number of words such as advise, analyse, comprise, enterprise (see *Oxford English Dictionary*).
11. Use the simplest possible form for mathematical symbols.
12. Keep tables to a minimum, but do not try to convey too much information, at the cost of simplicity, in any one table.
13. For book reviews use the following form for headnotes:
   A. JONES. *Depreciation*, Publisher & Co., London 1966, vii + 212 pp.

NOW AVAILABLE

COLLECTED PAPERS OF THE FIFTH WORLD CONGRESS OF ACCOUNTING HISTORIANS

Held at The University of Sydney, Australia
21-24 August 1988.

Includes keynote addresses by Tom Johnson, Kyojiro Someya, Alicja Jaruga, Guo Daoyang and Ray Chambers, and over thirty other papers (approx. 1,000pp.).

Price: $70.00

Order from:
The Director
Accounting and Finance Foundation
University of Sydney H04
AUSTRALIA 2006

✂--

The Librarian

Please order   copies of the following:

ISBN 0 908269 92 7

Editor: A.T. Craswell

Title: Collected Papers of the Fifth World Congress of Accounting Historians

Date and Place of publication: 1988 Sydney, Australia

Publisher: *Accounting and Finance Foundation within The University of Sydney*

Price per copy: $70

ABACUS

A Journal of Accounting and Business Studies
published by the Accounting and Finance Foundation within The University of Sydney

VOLUME 24 NUMBER 2 SEPTEMBER 1988

CONTENTS

Wisdom or Widgets: Whither the School of 'Business'? *Dan Subotnik* 95

Evolution of a Lease Solution *G. H. Burrows* 107

Knowledge Preservation in Accounting: A Citational Study *Robert J. Bricker* 120

Auditors' Responsibilities for Events Arising After Balance Date *Donald J. Stokes and Graham G. Sullivan* 132

Changes in Task Uncertainty Induced by Zero-Base Budgeting: Using the Thompson and Hirst Models to Predict Dysfunctional Behaviour *Randall B. Hayes and William R. Cron* 145

Intuitive Choice of Cooperative Sharing Mechanisms for Joint Cost Savings: Some Empirical Results *Thomas L. Barton* 162

Capital Maintenance Adjustment Under the Financial (Real) Capital Concept *Denis J. Pratt* 170

Index to Volumes 21-24 179

EDITOR: M. C. Wells, University of Sydney

ASSISTANT EDITOR: G. W. Dean, University of Sydney

EDITORIAL BOARD

A. D. Barton, Australian National University
R. J. Chambers (Editorial Consultant), University of Sydney
F. L. Clarke, University of Newcastle
R. G. May, University of Texas at Austin
K. Someya, Waseda University
A. L. Thomas, University of Kansas
R. G. Walker, University of New South Wales
G. Whittington, University of Cambridge
G. P. Whittred, University of Sydney

EDITORIAL PANEL

P. Brown, University of Western Australia
D. M. Emanuel, University of Auckland
G. A. Feltham, University of British Columbia
W. L. Ferrara, Pennsylvania State University
S. J. Gray, University of Glasgow
P. Griffin, University of California at Davis
G. A. Lee, University of Nottingham
R. Ma, University of New South Wales
P. E. M. Standish, University of Tasmania
D. P. Tweedie, Thomson McLintock & Co., Edinburgh

ABACUS has as its objective the publication of exploratory constructive and critical articles on all aspects of accounting and on those phases of the theory and administration of organizations and of economic behaviour generally which are related to accounting and finance.

Manuscripts should be sent to the Editor and will be considered for publication only if accompanied by a submission fee of $30.00. The submission fee is waived if the author or a co-author is a personal subscriber to the journal. The general layout and style should follow the most recent Style Guide which is printed in the journal from time to time.

Editorial correspondence should be adressed to The Editor, ABACUS, c/- Department of Accounting, University of Sydney, N.S.W. Australia 2006. Business correspondence should be sent to Basil Blackwell Publishers.

Two parts (March and September), making one volume, will be published each year, and the annual subscription for 1989 (surface mail) is: individuals A$30.00; institutions, libraries and firms A$60.00. Single copies are available at half the annual rate. Some back issues are still available—prices are A$20 per part or A$40 per volume. Subscriptions should be sent to the publishers.

BASIL BLACKWELL PUBLISHERS, 108 Cowley Road, Oxford OX4 1V4, United Kingdom; within Australia, 107 Barry Street, Carlton, Victoria 3053.

Copyright is reserved and requests for permission to use, reproduce or photocopy any part of any material appearing in ABACUS must be made in writing to the Publisher. Microform and photo copies may be obtained from University Microfilms International (*U.K.* — 18 Bedford Row, London WC1R 4EJ. *U.S.A.* — 300 North Zeeb Road, Ann Arbor, Michigan 48106). Also where necessary permission is granted for libraries and others registered with the Copyright Clearance Center (CCC) to photocopy any article herein for the flat fee of US$2.50 per copy of the article plus 15 cents per page. Payments should be sent directly to the CCC, 21 Congress Street, Salem, MA 01970, U.S.A. 0001-3072.

Copyright © Accounting and Finance Foundation

Printed in New Zealand by Wright & Carman Limited

ABACUS, Vol. 24, No. 2, 1988

DAN SUBOTNIK

Wisdom or Widgets: Whither the School of 'Business'?

The development of quantitative methods has proved to be invaluable in contemporary academic life; it has opened up the world to empirical studies. Yet there is a cost. 'The mind of man,' writes John Dewey, 'is taken captive by the spoils of prior victories' (Gummere, 1988, p. 25). In the social sciences, and particularly in the business area, quantitative methods have become a fetish and have led to the crowding out of non-empirical work. 'Wisdom or Widgets' examines the implications of this disturbing phenomenon.

Key words: Knowledge; Research.

> It is important that students [at the university] bring a certain ragamuffin, barefoot irreverence to their studies; they are not here to worship what is known but to question it.
>
> JACOB BRONOWSKI (1973, p. 360)

'We are not in the wisdom business; we are in the research business.' With these words, a nationally known accounting professor at a top American business school dismissed a paper, proposed for a department workshop, which would have questioned the educational philosophy standard in his (and my) discipline.

Though rarely so starkly put, these words seem to articulate a belief prevalent today in many of the social sciences. In the business branch of the social sciences, in fact, wisdom-seekers may soon be driven completely out of business.

It seems appropriate, then, to take a close look at how the 'research business' has come to prosper in academia. I think it will become clear that both of the terms in this phrase, 'research' and 'business', point to metaphors which exert a great deal more power on the structure and self-conception of academic disciplines than is commonly realized. In effect these metaphors have made it not only respectable but also highly desirable for scholars to treat knowledge as an end product, or widget, rather than as a pathway to wisdom.

'RESEARCH', OR THE SCIENCE METAPHOR

> The pursuit of knowledge in our time differs radically from the Socratic pursuit of wisdom. When we say 'knowledge' we mean *scientific* knowledge.
>
> PROFESSOR LEON KASS, University of Chicago (1984, pp. 28-9)

DAN SUBOTNIK is Associate Professor, Touro College, Jacob D. Fuchsberg Law Center, and Lecturer in Accounting, University of Chicago Graduate School of Business.

> Through the mythology of Einstein, the world blissfully regained the image of knowledge reduced to a formula . . . [and of] the universe [as] a safe of which humanity seeks the combination.
>
> ROLAND BARTHES (1987, p. 69)

'Research' at the American university connotes both an activity and its result. When this activity takes place in disciplines outside the natural or physical sciences, but using the same techniques, it is assumed to be an extended application of 'scientific method'. Consequently, its end products are highly valued in academia, for they are seen as equivalents to scientific results, which have themselves become the very paradigm of knowledge in twentieth-century America. In short, research owes its academic prestige mainly to the widespread acceptance of science as the chief model for all knowledge.

But 'paradigms' of 'models'—terms widely fashionable in universities today—are at bottom, as structuralist literary theory long ago pointed out, synonyms for the term 'metaphor'. And metaphors, as Justice Cardozo once cautioned, 'are to be narrowly watched, for starting as devices to liberate thought they end often by enslaving it'.

Little or no revision, however, has taken place in either the idealized status or the content of the scientific models which are used as metaphorical justifications for so much 'research' outside the sciences. Science has given us a hammer—to borrow from an old adage—now all our problems look like nails. The protected status we have granted the scientific paradigm has been self-perpetuating. It has kept us from looking seriously at the enormous direct and indirect effects of this paradigm on academic life and, most importantly for our purposes, the appropriateness of the paradigm to fields outside the natural sciences.

But even at the outset there is no compelling reason to suppose that the structure and operation of epistemological paradigms within the natural sciences and in other fields are so similar as to justify making science itself a paradigm for all knowledge. Indeed, Thomas Kuhn, who in *The Structure of Scientific Revolutions* popularized the term 'paradigm' to describe models within individual disciplines, regularly emphasizes important differences between such fields as physics and accounting. As a discipline that studies nature, according to Kuhn, physics is ordinarily governed by a single paradigm at a time; and this unity normally frees physicists to restrict the design of their problems and solutions to a continuous attempt at refining the most recently established paradigm. Most of the time they can do this work single-mindedly, without having to worry about earlier, conflicting or alternative paradigms—and without primary regard for the social usefulness of their results.

By contrast, Kuhn says, the student in the social sciences, like others whose field of inquiry is social behaviour rather than nature, works in constant historical awareness of what Kuhn calls 'the immense variety of problems that [his predecessors] have, in the course of time, attempted to solve'. Even more important, as Kuhn persuasively argues (p. 165), such a student 'has constantly before him a number of competing and incommensurable solutions to these problems, solutions that he must ultimately evaluate for himself' (i.e., without the help of any single governing paradigm). Nor, it should be added, can a student in the social sciences make the natural scientists' prima-facie case for disregarding society's interest in his results or for subcontracting the social evaluation and application of his work to some other branch of the academy. By these standards alone, our presumption should, if anything, be *against* modelling study in the social sciences on the inner paradigmatic structure of physics.

Moreover, even if we do in practice view the social sciences as sister disciplines of physics, our conception of science (as we shall see in a moment) is for the most part outdated, vulgarized, and simplistic. On the whole, our working image of science can be reduced to a single narrowly positivistic principle: Truth is to be found only through application of empirical methods.[1] Let us call this the Principle of Quantitative Unassailability.

The problem is that science – or at least the best science – doesn't really work this way. 'Contrary to what I once thought', writes Nobel Prize winner Francois Jacob, 'scientific progress does not consist simply in observing, in accumulating experimental facts and drawing up a theory from them. It began with the invention of a possible world, or a fragment thereof, which was then compared by experimentation with the real world. And it was this constant dialogue between imagination and experiment,' he concludes, 'that allowed one to form an increasingly fine-grained conception of what is called reality' (*New York Times*, 1988, p. 31).

Speaking for the social sciences, Robert Lynd (of *Middletown* fame) draws out the implications of this view. 'Empiricism,' he urges, 'should not be confused with the full-bodied work of science' (1986, p. 222). How are research projects to be selected? Not 'because they represent interesting moves on an impersonal intellectual chessboard' (p. 208). Rather,

> wherever our current culture is found to cramp or to distort the quest of considerable numbers of persons for satisfaction of basic cravings of human personality, there lies a responsibility for social sciences. In such cases, the . . . charge upon social science appears to be to ask . . . [I]s the trouble inherent in the kind of culture we have? . . . What alternative kinds of cultural situations would satisfy more directly and amply the cravings that are now starved? What specific research is needed to test out these alternatives? And, if a given alternative, when tested, seems sensible and desirable 'in theory, but not in present practice', what techniques and what stages of change would be needed in order to get us from here to there? (pp. 205-6)

One would think that in formulating his critique forty years ago, Professor Lynd had the numbing ahuman research in security prices firmly in mind.

Whatever its limitations, for many in the social sciences the Principle of Quantitative Unassailability has evolved into an article of faith. In the Sociology department at Harvard, for example, so great is the devotion to it that not long ago a Pulitzer Prize-winning faculty member failed in his quest for tenure apparently because his work was too theoretical. And this is hardly an isolated occurrence. In no discipline, however, does the curve of the devotion function reach a higher point than it does in the business area. Why is this so? Although no definitive conclusion can be reached, it seems useful to offer a theory. One of the difficulties historically faced by business faculties has been responding to sceptics (both inside and outside the university), who in effect asked, 'If you're so smart, why ain't you rich?' Historians, anthropologists and humanists have not had this problem since they claim no special knowledge in the field of commerce, frequently understood as 'money-making'. Quantitative methods have proved convenient here. In helping to demonstrate the efficiency of markets, they have saved business scholars from embarrassment over their balance sheets. And, to the extent there have been any remaining doubts about the legitimacy of the business discipline, quantitative methods have allayed them by transforming the field into one that resembles physics, the quintessential academic subject. Through empirical methods, in short, business academics have been able to unimpeachably claim a place alongside their brethren in the academy.

---

[1] A recent paper provides a striking, and contrasting view. Arguing that good science rests ultimately on intuition and that 'personal involvement with the subject matter is more central to the scientific method than is precision of technique or vocabulary', Dr Robin Wallace of Scripps College notes that Albert Einstein 'published many of his most influential papers with no experimental backing at all'. (Paper given at the 1987 annual meeting of the American Musicological Society.)

In any event the Principle of Quantitative Unassailability shapes virtually every aspect of academic work in business schools beginning with the choice of courses offered to advanced students. One might suppose, for example, that courses in American business history and in the development of economic theory would be required, or at least recommended, for a PhD in business. Yet at the University of Chicago Graduate School of Business, among other distinguished business schools, students rarely get exposure to these kinds of courses. In such schools, no less characteristically than in physics or chemistry as Kuhn describes them, science makes history obsolete. Similar reverence for the Quantitative Unassailability Principle characterizes the editorial policies of business journals, where it has been quite difficult to get anything published in a top-rated journal which is not the product of quantitative techniques.

In the accounting area the greatest commitment to the quantifiably unassailable is that of the *Journal of Accounting Research*. 'The Journal,' says the editor, 'employ[s] more mathematics, statistics, empirical research and the like than other accounting journals.' In the interests of fair labelling one wonders: Should the journal be stripped of its title and required to substitute something like 'The Journal of Empirical Research in Accounting'?

In short, academic research regularly takes the form of problems that can be answered unassailably in empirically quantifiable terms. Inevitably, the effect of this process is that knowledge becomes identified solely with the solving of just such problems.

This is, of course, precisely the sort of single-paradigm situation that Kuhn finds characteristic of 'normal' science. '[O]ne of the things a scientific community acquires with a paradigm is a criterion for choosing problems that, while the paradigm is taken for granted, can be assumed to have solutions. To a great extent,' Kuhn goes on, 'these are the only problems that the community will admit as scientific or encourage its members to undertake. Other problems, including many that had previously been standard, are rejected as metaphysical, as the concern of another discipline, or sometimes as just too problematic to be worth the time' (1970, p. 37).

Here in the highly overcritical—yet not unperceptive—eyes of Professor Abraham Briloff, is how the mathematics-based paradigm has affected accounting scholarship:

> In our research endeavors the academic community finds our presumptive first-rate accounting intellects constrained to demonstrate their competence as second-rate financial analysts, applying third-rate mathematical methodology to fourth-rate data contained in various computerized data banks compiled by fifth-rate accounting drones. As a consequence, the leading journals, wherein accounting academics are compelled to publish lest they perish, demonstrate intensified mathematical sophistication, with diminished contact with the real world. (1984, pp. 509-10)

Consistent with Kuhn's scheme, the high value placed on empirical studies by business scholars has tended to exclude by definition 'other' sorts of problems—that is, problems not shaped by the reigning paradigm—from the domain of knowledge. These latter, then, are deprived of a legitimate claim on academic thought, whether such problems involve inquiry into 'oughts' (as opposed to 'is's'), or inquiry into the kinds of 'is's' that might be established through conceptual theory and judgment (as opposed to, say, counting and measuring). This leaves little room for working out the relationship between business principles and ethical systems or for connecting the development of commerce to changes in intellectual currents. This time science puts both history and ethics on the shelf.

In accounting, there is another price we pay for current scholarly values. For more than a generation there has been general recognition of the need to develop a comprehensive conceptual theory for accounting. Nevertheless, academic interest in this work has been minimal. The same can be said for interest in the promulgation of new pronouncements. The astonishing aspect of this has been captured by Briloff in his rebuke of the accounting academy for its 'abject acceptance of the FASB's having preempted the sphere ordinarily presumed to be that of academe, namely, the advancement of the theoretical infrastructure for a particular discipline. Put otherwise', he writes, 'I know of no other academic community which has correspondingly abdicated its responsibility for the advancement of its very special body of knowledge to a group of 7, 70 or 700—no matter how enlightened that elite group might be' (p. 509).

We might suppose that the ultimate justification for the number-crunching in academic business studies is that business itself is run by the numbers. At least ex-Norton Simon CEO, David Mahoney, says they are; but, he adds, this is a serious mistake. 'We have become slaves to numbers', he writes, 'and we are judged by them. But they are not real—not by a long shot' (p. 162).

In any event the large-scale result of the heavy concentration by business and other social science academics on empirical work is that as more and more of this kind of research reaches publication, the paradigm for their very process of creation comes to seem less persuasively like the thoughtful exercise of scientific method and more like the unvaried replication of a model, as in cookie-cutting—or assembly-line production.

In fact, it is precisely at such a point that we can observe most clearly the peculiar transformation that occurs in the scientific metaphor as it operates, by way of the Quantitative Unassailability Principle, in the academic world. As 'techniques' are increasingly refined for reducing the 'scientific method' to a guarantee of empirical quantifiability, the pursuit of knowledge is turned into the production of research, and knowledge itself becomes a product or commodity. Once the benefits of the Quantitative Unassailability Principle become apparent—that is, foreclosure of debate over the importance or the integrity of the argument—it is only a matter of time until, for similar reasons, five articles necessarily become better than three. In other words, researchers over time came to superimpose another quantitative business paradigm upon their work product—factory output. Having rendered history obsolete, the operation of the scientific model relentlessly transforms the pursuit of knowledge itself into a business proposition.

'BUSINESS', OR THE PRODUCTION METAPHOR

[O]ne speaks about [Einstein's] thought as of a functional labour analogous to the mechanical making of sausages . . .

Roland Barthes (1987, p. 68)

Most interesting is the relative length of [legal] articles, by rank: As one goes from acting professor to Dean, articles get shorter. Footnotes per article also decrease. Footnotes per page decrease as well . . .

Professor Ira M. Ellman, Arizona State University School of Law (p. 683)

Here is a statement of editorial policy by *The Accounting Review*, a leading business journal:

> Emphasis is placed on the aptness of the research question, the suitability and soundness of the research methods, the effectiveness with which the entire exercise is communicated to the reader, and, above all, the significance of the research as an addition to the stock of knowledge. (1986, p. 337)

There we have it: Knowledge has been transformed into inventory.

The kind of situation to which this quoted passage refers does not ordinarily breed admiration among academics. Widgets have far less intellectual cachet than scientific results. Nevertheless, imagery associated with the production of widgets has even more influence in academia than the quasi-scientific paradigm which (de)generates (into) this imagery. Extending its reach not only to the content of research but also to the entire structure of academic life itself, the production metaphor is a scholarly paradigm that leaves no domain of inquiry untouched, even in the natural sciences and the less quantified humanities.

Certainly the metaphor of production operates openly in the fields of law and business. Take the sheer emphasis on quantity of publication, which could be called the Production Quota Principle. 'What is quantifiable is scholarship,' says the Dean of Chicago's Loyola University Law School, Nina Appel, 'and that is defined as law journal articles published' (p. 4). The American Bar Association Accreditation Committee complains about a school's 'insufficiency of faculty scholarly productivity and publications' under its Standard 401, while giving no evidence of reading a word of what was written.

Robert Abrams, former Interim Dean of the Law School at Wayne State, is most explicit:

> Completing and submitting for publication at least one item per year is a good pace . . . There are sufficient reasons why quantity rather than quality of writing carries significantly more weight in tenure decisions. Creating a calculus for measuring the quality of scholarly writings is an elusive task . . . There can be no debate about how many creditable pieces of writing a tenure candidate has produced, and more is better. (pp. 1, 2, 12)

Barthes would understand the Dean. 'By reducing quality to quantity', he has observed, 'myth economizes intelligence: it understands reality more cheaply' (p. 153).

The situation is no different in the accounting area which has produced a minor literature on the subject of the research productivity of different business faculties on an overall and per capita basis. And consistent with the production metaphor, promotion and tenure decisions have come to depend heavily on the Production Quota Principle; ordinarily, in both the law and business markets, two or three articles of a standard type are sufficient for a grant of tenure.

But what are the implications of these values? What are the long-term consequences for academia? The following classic Yiddish story seems instructive.

Moe had some extra cakes on his hands when he ran into his old friend, Joe.

'Joe,' he said, pointing to the cakes, 'I have a great deal for you. I can let you have them for 50 cents a box. You'll never find such a bargain.'

Whereupon Joe purchased the cakes. Shortly thereafter Joe ran into his good friend, Izzy, and offered him the same opportunity for profit, only the price was $1 instead of 50 cents. Well, this goes on for three more rounds by which time the price reaches $10. At this point the seller sells them to his friend who wants to use them for his daughter's wedding reception.

The cakes are a disaster. The humiliated father of the bride goes to his good friend and asks him how he could possibly have recommended the cakes when they were so awful. This starts a chain reaction in which all the buyers go to their seller to find out what happened.

Finally Joe corners Moe and tells him about the foul cakes.

'What!' exclaims Moe incredulously. 'He actually served them? Didn't you know? Those weren't eating-cakes, those were buying-and-selling-cakes.'

This humble yet archetypal story drives home a truth that cannot be wrung out of empirical research and that is at least as valuable as the kind that can. It tells us that we sometimes forget the original purpose of things. Surely that has happened to our academic scholarship. Ours are no longer reading-articles, they are writing-(and-citing)-articles.

The result is ironic. If academia really accepted the business metaphor wholesale, the problem might have solved itself—for American business has imported the Japanese manufacturing practice known as the Quality Control Circle. But in our individualist academic environment, would faculty members countenance a standing academic committee, headed by the Dean, that could prevent them from putting out an article under the institution's label on the grounds of quality control?

Occasionally, however, the issue is not how much a candidate has written but whether his work has been published in journals of 'high standing'. Now it might be thought that at least with respect to the ranking of the journals, academic research has managed to favour individual judgment over the quantitative biases implicit in the science and production metaphors. Yet the accounting field, at least, has found a 'scientific' way to bypass the vagaries of individual judgment in the process of ranking: The academic population is regularly polled to determine the relative standing of the various journals.

Such processes of polling, of course, bear a certain similarity to an activity important in business imagery, namely market research. And in fact academic journals to no small extent function as a kind of Consumer's Guide to Scholarly Projects. Thus when a philosophy professor at Yale, through a letter to the *New York Times Magazine* in effect advises laypeople to reject deconstruction, she does not try to demonstrate in any substantive way that the method is worthless. She merely informs us that the method 'is not usually [discussed] on the pages of refereed philosophical journals of quality' (Marcus, p. 118). In other words, deconstruction is 'out'. Sad to say, the professor's reference here to 'journals of quality' has exactly the same tone (and import) as similar phrases that adorn the advertising copy in *The New Yorker*.

But it is not just our scholarly 'product' that is marketed. We as academics have ourselves become widgets. We acknowledge this in a very direct way by the degree of importance we attach to each other's labels. At academic conventions, for example, it is the brand name, that is, institutional affiliation, that largely determines who will get our attention.

I myself was once told at the outset of a job interview: 'This is a statistically oriented department. We look for people who can complement [or was it "compliment"?] our work.' The University of Chicago demands empirically oriented scholars on its Business faculty. Harvard wants to perpetuate the case method. The law of comparative advantage—yet another business image—is sometimes cited in justification of the resulting intellectual homogeneity. In practical terms what all this means is that the market for business schools is as segmented as that for peanut butter.

But is this what a 'univers-ity' is all about?[2] If we are after truth, or even knowledge, is the law of comparative advantage a useful notion? We don't restrict universities themselves to a single subject. 'The art historian,' wrote Erwin Panofsky, 'may know as little of the diacritical signs in Arabic as the arabist does of Caravaggio. But that the two gentlemen [*sic*] are bound to see each other every fortnight at a faculty meeting is good . . . for the university because they may have well-founded, if divergent, views about general policies which may be profitably discussed in pleno' (1955, p. 337). This argument is valid within departments as well. Students should not go to universities to buy a product—to learn a single method—but to develop a broad-based understanding that there is more than one way to define a problem.

'Our students deserve an education formed from many different perspectives,' writes the ex-president of the American Association of Law Schools, 'and the broader curriculum that comes from faculty members with different identities and interests' (Prager, 1987, p. 1). Do business school Deans say things like this?

---

[2] Regarding my syllabification, Jacques Barzun has informed me in a private communication that my 'intention . . . by spelling university with a hyphen may be misguided. In the Middle Ages, which used the word first, all it meant was corporation. It has never implied a "complete view of the universe". But,' Barzun concedes, 'this may be hair-splitting.'

Of course, not all academics go so far as to take the position openly that diversity should be discouraged in their departments. Nevertheless, refereed philosophical journals don't discuss deconstruction. And, on a faculty of one hundred, the University of Chicago Graduate School of Business does not have a single socialist economist. The explanation of this lack once given to me by a chaired professor—that 'there are no first-class socialist economists'—seems to me shockingly naive if not outright disingenuous. The tendency in academia (human, but not necessarily forgivable) is to dismiss those who are ideologically divergent on grounds that they lack rigour.

I would argue that it is not really possible to understand our economic system without a perspective of an alternative, or better yet, an opposing system. Surely it is the presence of conflicting viewpoints, not ideological conformity, that academic tenure and freedom were developed to protect. One wonders what kind of rigor (other than mortis) can flourish under conditions which require no criticism of one's own prejudices.

Total inbreeding increases the probability of inherited defect; it also debilitates the mechanisms of immunity, making every contact with the outside world potentially lethal. We could minimize the latter risk in academia by renouncing the 'enrichment of life' as a goal of knowledge and declaring isolation our official scholarly policy. But how would this look to the Guggenheims and Mellons and those other 'philanthropists' who still think that knowledge, by some mystical process, helps make the world a better place? Would they support a system that engages in research for the sake of enriching research? To keep up production one needs to operate at a profit. And such a declaration could kill off our profits in higher education.

THE MAN OF SCIENCE

[The . . . man of science], alarmed and dissatisfied at his own consequences, no longer dares entrust himself to the terrible icy current of existence; he runs timidly up and down the bank.

FRIEDRICH NIETZSCHE (1967, p. 113)

[T]he very end of myths is to immobilize the world: They must suggest and mimic a universal order . . . [E]veryday and everywhere, man is stopped by myths referred by them to this motionless prototype . . . which . . . stifles him in the manner of a huge internal parasite and assigns to his activity the narrow limits within which he is allowed to suffer without upsetting the world.

ROLAND BARTHES (1987, p. 155)

All these are deleterious effects that follow when scientific method is reduced to a mystique of the quantifiable, which in turn transforms the pursuit of knowledge into a production operation. But even worse, in my judgment, is the profoundly demoralizing effect that the metaphors of the 'research business' have upon our ability as academics to sustain intellectual ideals and aspirations—or, in short, a vision of our own highest capacities.

There's plenty of room in the tool-and-dye business for people whose goal is a paycheck. People who enter academia are often initially attracted by the chance of creating something of lasting value in the domain of thought that could give them a kind of immortality. But an academic system which prizes the quantitative production of the quantitatively unassailable promises a poor kind of immortality at best. The eventual consignment of 'successful' academics to a footnote in history, as new data supplant old, discourages and often weeds out those who long to rise above the footnote and be part of the text.

We can see this demoralization setting in at very early stages in our students' careers, as the powerful metaphors of the 'research business' begin to impose their restrictions on the doctoral dissertation.

We have an operating rule in academia, that in writing a dissertation one should continuously narrow one's vision. The common wisdom is that the supreme, if not the only, objective in a dissertation is to make a statement that is unassailable. This position has profound implications. A genuinely important statement in any field will rarely be unassailable, for its importance is that it challenges the order of things; and there are always those who defend the old ways.

Actually, the prevailing wisdom also affects years after the dissertation. Dr Robert Ballard of the Woods Hole Oceanographic Institute describes the situation well. He had caught *Titanic* fever years ago. 'But in my early days,' he explains, 'I was hardly in a position to realize such a dream. I was young and I didn't have my PhD—let alone tenure. My scientific reputation was barely in the making' (p. 32).

The focus here is 'tenure', not knowledge, expertise, or fundraising skills. Since the venture involved a serious risk to Ballard's professional stature, one wonders: Lacking tenure would he ever have set out to 'discover' the *Titanic*? Or, would the *Titanic* still be lying in an unmarked tomb at the bottom of the sea?

As it happens, the accepted strategy for surviving the first academic job is precisely the one employed by 'scientific man' in overcoming the problem of his own insignificance and mortality—the one area of human existence in which he has made precious little progress.

Here is how Ernest Becker describes the strategy of such a person in *The Denial of Death*.

> [He] cuts out for himself a manageable world: he throws himself into action uncritically, unthinkingly. He accepts the cultural programming that turns his nose where he is supposed to look; he doesn't bite off the world in one piece as a giant would, but in small manageable pieces as a beaver does . . . He learns not to expose himself, not to stand out . . . [T]he result is that he comes to exist in the imagined infallibility of the world around him. (1973, p. 23)

No wonder many of the best and brightest among us never get off the ground as academics; for them this is a prescription not for life but for death. The intellectually adventurous among us want not only to take positions that can be 'conclusively' established, but also to explore areas where there is no possibility of conclusive proof. What's the attraction of this ultimately frustrating kind of work? Perhaps Santayana offers the best explanation. 'All problems,' he wrote (crediting an unnamed mathematician), 'are divided into two classes, soluble questions which are trivial and important questions, which are insoluble' (1968 p. 245).

Will potential academics willingly spend twelve years 'playing it safe' at the expense of a shot at the moral or metaphysical fulfilment that might come from developing one's uniqueness, values, dreams, worldview? From seeking to enrich and brighten human life? From trying their luck in 'the wisdom business [wiz-biz]'?

Hardly. Who then is left to populate academia? Too often it is those who are not burdened with great dreams or an acute self-critical faculty. And look what happens to people once they are tenured. Do they then flower in the sunshine of professional liberation? All too seldom. More often we see them as humourless husks littering the 'infallible' landscape of academia, sapped of life force, still scared of their own shadow, numbly imparting 'certified' brands of knowledge to their (sleeping) students.

And still living in dread of being found fallable. Nietzsche criticized the 'man of science' for construing 'error as the evil par excellence' (p. 97). Likewise in our own quantified context it often seems as if error was erroneously omitted as the eighth deadly sin. But is the social cost of error necessarily greater than that of institutionalized tunnel vision? Kuhn himself concludes that 'the price of significant advance—that is, progress in the natural sciences—is a commitment that runs the risk of being wrong' (1970, p. 101).

We speak and act in academia as if our current values are imposed on us by Higher Authority. Yet it is not a law of Nature that grim plantings and grim plantings alone can stave off the grim reaper. Nor are we really all that powerless to define priorities in higher education that allow, or better yet, encourage our full self-actualization. We should ask ourselves whether we would want to live in an academy which no longer has room for the Nietzsches, Bronowskis, Beckers, the Max Webers or, in accounting, the William Patons. (Professor Paton, founder of the *Accounting Review*, is the AICPA's Academic Accountant of the [its] Century.)

Probably few of our intellectual giants would argue that the infinite variability of human thought and experience can be entirely captured as data, to be processed mechanically and impersonally by 'scientific' methods of production. 'Perhaps', wrote Nietzsche, 'there is a realm of wisdom from which the logician is exiled? Perhaps art is even a necessary correlative of, and supplement for science?' (p. 93).

Typically, our towering figures have not required a vast desert of data to educate us about what is and what could be. Instead, with labours no less arduous than the scientists', they sift human experience through an ongoing analysis of their own experience and of diverse ideas of others to find whole worlds in a few grains of sand. Their highest vantage point has not been the 'massive [plateau] of specialized knowledge overlooking a desert', which for Panofsky characterizes so much of American scholarship (1955, p. 340), but the mountaintop that affords a view of promised lands.

Ahad Ha'am, a prominent Israeli essayist, classified leaders into two categories, priests and prophets, suggesting that society needs both to function well. In academia, only our priests are flourishing (1912, pp. 125-38). We are killing off our prophets.

REFERENCES

Appel, N., *National Law Journal*, 26 January 1987.

Abrams, R., 'Sing Muse: Legal Scholarship for New Law Teachers', *Journal of Legal Education*, March 1987.

Ballard, R. D., *The Discovery of The Titanic*, Warner/Madison, 1987.

Barthes, R., *Mythologies* (trans. Annette Lavers), Hill and Wang, 1987.

Becker, E., *The Denial of Death*, Free Press, 1973.

Briloff, A., 'Corporate Governance and Accountability Malaise', *Journal of Corporation Law*, Vol. 9, 1984.

Bronowski, J., *The Ascent of Man*, Little, Brown, 1973.

Cardozo, B., *Berkey* v. *Third Ave. N.Y. Co.*, 244 NY 84 (1926); rehearing denied, 744 NY 602 (1927).

Dewey, J., quoted in Gunmere, R., 'He's Back', *Columbia*, April, 1988.

Ellman, I., 'A Comparison of Law Faculty Production in Leading Law Reviews', *Journal of Legal Education*, Vol. 33, 1983.

Ha'am, A., 'Priests and Prophets' in *Selected Essays*, Philadelphia, 1912.

Jacob, F., *The Statute Within* (trans. Franklin Phillip), Basic, 1988, quoted in *New York Times Book Review*, 27 March 1988.

Kass, L., 'Modern Science and Ethics: Time for a Re-examination?', *The University of Chicago Magazine*, Summer 1984.

Kuhn, T. S., *The Structure of Scientific Revolutions*, University of Chicago Press, 1970.

Lynd, R., *Knowledge for What?*, Wesleyan, 1986.

Mahoney, D., *Confessions of a Street-Smart Manager*, Simon & Schuster, 1988.

Marcus, R. B., Letter to *The New York Times Magazine*, 16 March 1986, p. 118.

Nietzsche, F., *The Birth of Tragedy* (trans. Walter Kaufman), Random House, 1967.

Panofsky, E., *Meaning in the Visual Arts*, Doubleday, 1955.

Prager, S., *Association of American Law Schools Newsletter*, December 1987.

Santayana, G., 'What is Aesthetics?', in I *Selected Critical Writings of George Santayana* (ed. Henfrey), Cambridge University Press, 1968.

ABACUS, Vol. 24, No. 2, 1988

G. H. BURROWS

Evolution of a Lease Solution

The lease solution most frequently advocated in the literature, that in which the after-tax cash flows of leasing and borrowing are discounted by the after-tax borrowing rate, is invariably associated with Myers, Dill and Bautista (MDB; 1976). This article, while accepting the basic assumptions underlying this solution, attempts to identify its origin and the process by which it evolved. The finding is that Bierman and Smidt (1966) pioneered this approach which has its antecedents in the works of Gant (1959) and McEachron (1959). Post-MDB developments in this solution are analysed and a critique is offered of an alternative evaluation approach advocated in MDB's influential work.

Key words: Capital budgeting; Financial leases; Leases.

INTRODUCTION

When Howard (1983, p. 52) described the lease solution in which after-tax cash flows of leasing and borrowing are discounted by the after-tax borrowing rate as 'authoritative', he stated a popular, though not universally accepted, view. Like Brealey and Myers (1981) earlier, and Van Horne, Nicol and Wright (1985), Bishop, Crapp and Twite (1984) and Franks, Broyles and Carleton (1985) subsequently, Howard linked this solution directly to Myers, Dill and Bautista (MDB; 1976). Many other writers associate MDB with this solution, although none actually credits them with its origin.

Despite the scholarly respect for precedence evident in much of the accounting and finance literature, a reader would scan 1980s leasing works in vain to identify the originators of this solution. Ironically, if historical homage is paid to any writer, it is to Vancil (1961a), who advocated a different approach. The earliest figure usually identified with the 'authoritative' solution, Beechy (1969, 1970), had the misfortune to utilize IRR analysis, rendering his work less than academically respectable.

Ignored by some and unknown to most is that the 'authoritative' solution was pioneered by Bierman and Smidt (1966). Similar solutions were also advocated by Weston and Brigham (1969) and Middleton (1971) well before, and with greater commitment than, MDB. Despite the originality of their treatments of taxation and capital structure, MDB presented their solution only as an interim step *en route* to a

---

G. H. Burrows is Senior Lecturer in Accounting, The University of Melbourne.

The author is indebted in various ways to Ken Middleton, Ken Wright, Bill McEachron, Harold Bierman, Jr, and Seymour Smidt.

more elaborate procedure which they were unable to operationalize. This article aims to clarify the evolution of the 'authoritative' solution and to focus critically on the contribution of MDB.

A CHRONOLOGY OF LEASE SOLUTIONS

Gant

Although articles on specific aspects or industry applications of leasing peppered business and professional publications in the 1940s and 1950s, the modern leasing debate dates from the critical overview of Gant (1959). An investment banker who had observed sceptically the proliferation of equipment leasing in the United States during the 1950s, Gant posed three questions:

> Is lease financing a new approach or merely another form of borrowing? Are the advantages which lease financing appears to offer over ownership real or illusory? Can lease financing really make it possible for a company to have its cake and eat it too? (1959, p. 121)

Gant answered all three with a resounding 'no'. Arguing that leasing was merely a special, albeit high-cost, form of borrowing, he disputed many of the purported economic advantages of leasing, and criticized the omission of leases from financial statements.

In Gant's non-DCF lease solution, an asset's price was augmented by interest payments, net of tax deductions and depreciation tax savings, to give the total cost of ownership financed by borrowing. Owning an asset meant that the costs of leasing were avoided and Gant deducted total after-tax lease payments from cash costs of ownership. If the final sum was positive, leasing was cheaper than borrowing; if negative—as it was in Gant's example—leasing was costlier.

In the replies crowding the next two issues of the *Harvard Business Review* (HBR), Gant's views on leasing were endorsed by accountants[1] but opposed by lease financiers. Prominent among his opponents was Alvin Zises, a leasing corporation president, who outlined a number of legal and taxation differences between leasing and borrowing. More significant was Zises' contention that lease finance was a substitute for both debt and equity capital. On this basis, he argued that the cost of leasing should be compared with the cost of capital, not, as Gant asserted, with the cost of borrowing. This debate was replayed two years later when Gant (1961) again questioned the worth of leasing and Zises (1961) replied at article length.

McEachron

While the Gant-inspired debate was filling the HBR's correspondence columns, delegates to a Chicago management science conference heard a paper on lease evaluation delivered by William D. McEachron (1959), Head of Long-Range Planning for Standard Oil (Indiana). McEachron's principal concern, arising from a problem confronting his employer, was the evaluation of projects which included assets which could only be leased. Conscious of the danger of confusing financing and investment decisions (although he did not use these terms), he outlined a series of steps to unbundle the lease cash flows from a project to arrive at 'pure' project cash flows for which the IRR (which he preferred to NPV) could be determined. This figure could then be compared with the firm's cut-off rate to determine the project's acceptability. Although McEachron dealt with the choice between leasing and borrowing only incidentally, his analysis has proved to be seminal. To understand McEachron's solution better, and to compare it with others using DCF analysis, it is useful to consider an uncomplicated leasing agreement.

---

[1] Including Arthur Andersen partner, Leonard Spacek, and AICPA Director of Research, Carman G. Blough.

Example: A $12,000 asset can be leased or bought from the proceeds of a $12,000 loan. The lender would charge interest at 8 per cent per annum and require repayment in two annual instalments of $6,729 commencing one year later. Leasing would involve two annual payments of $6,822 also commencing one year hence (an implicit interest rate of 9 per cent). The asset can be depreciated at 50 per cent per annum using the straight line method. Tax relief is available immediately on deductions for lease payments, interest and depreciation. The borrower/lessee's tax rate is 25 per cent. The cost of capital (hurdle rate) for this project is 12 per cent per annum. A highly simplified version of McEachron's solution, adapted to NPV presentation, follows in Table 1.

TABLE 1

LEASE EVALUATION – McEACHRON

Year	Project cash flows	Borrowing tax deductions (depn + int.)	Lessor's premium and leasing tax deductions	Adjusted cash flows
0	$12,000	–	$ 165	$12,165
1	(1,500)	($1,743)	1,706	(1,463)
2	(1,500)	(1,626)	1,706	(1,580)

PV of original cash flows at 12%: $9,465
PV of adjusted cash flows at 12%: $9,599
PV disadvantage of leasing: $134

In Table 1 the sequence of McEachron's operations is reversed to start with project cash flows exclusive of financing charges. The next two columns show the adjustments to these flows to allow for the differential effects of leasing and borrowing. The lessor's premium[2] is the difference between lease payments discounted by the pre-tax borrowing rate, $12,165, and the principal amount of an alternative loan, $12,000. This calculation converts the higher implicit cost of leasing to an equivalent capital sum. The tax deductions for interest refer to a loan of $12,165, which McEachron viewed as the debt capacity displaced by leasing. The outcome of these adjustments is that the project's NPV is diminished by $134 if it is financed by leasing instead of borrowing.

McEachron's views soon reached a wider audience. He received over one hundred requests for copies of his paper, including one from Harvard University's Richard F. Vancil. In August 1959 McEachron attended a Cornell University seminar where he outlined his lease solution to his instructors, Professors Harold Bierman, Jr, and Seymour Smidt. He also disputed the relative merits of IRR and NPV with the Cornell duo. Perhaps in deference to their arguments, when his paper was subsequently published (McEachron, 1961) a preamble had been added stating that PV could be substituted for the IRR calculations used in the article.

---

[2] Although employing the concept, McEachron did not use this term.

Vancil

Reacting to the interest aroused by Gant's article, the HBR editors commissioned Richard F. Vancil and Robert N. Anthony to survey leasing. One aspect of the comprehensive study which resulted (Vancil and Anthony, 1959) hinted at Vancil's future approach to lease evaluation: Financial analysts were asked to calculate the liability amount which they considered to be equivalent to a given stream of lease rentals; less than 30 per cent calculated this amount by discounting future lease rentals by the rate implicit in the lease, considered by Vancil and Anthony to be the only valid approach.

Pursuing his interest in leasing, Vancil (1961a, 1961b) produced his acclaimed articles on the topic, which also formed the basis of a later monograph (Vancil, 1963). He wrote with great clarity on the differences between operating and finance leases, and between investment and financing decisions, matters which had already appeared in the literature but without Vancil's sharp focus. The distinction between operating and finance leases had been raised in the responses to Gant (1959). McEachron (1959) and Grant and Ireson (1960) had earlier discussed the importance of separating finance and investment decisions. Vancil also presented a lease solution based on the assumption that leasing, and borrowing to purchase an asset, were alternatives.

In his analysis of the borrowing proposal Vancil ignored all direct financing costs. Only the asset's original cost and its depreciation tax savings were considered. These latter amounts were discounted at the cost of capital, then deducted from the original cost to arrive at the present value of the investment elements of borrowing. This process is shown in Table 2.

TABLE 2

BORROWING CASH FLOWS—VANCIL

Cash price of asset				$12,000
Year	Depreciation charge	Depreciation tax deductions	PV of tax deductions at 12%	
1	$6,000	$1,500	$1,339	
2	6,000	1,500	1,196	
				2,535
				$9,465

Vancil then had to contrive the leasing counterparts of these borrowing cash flows. The acquisition 'cost' was calculated by discounting lease rentals at the pre-tax borrowing rate. The resulting PV, $12,165, represents the original asset cost swelled by the lessor's premium. The quasi-depreciation charges associated with leasing were calculated by splitting lease rentals into their principal and interest components, the latter being calculated by reference to the annual instalments of $6,822 and the loan forgone of $12,000. Tax savings attributed to the principal components of lease payments were then discounted at the cost of capital, consistent with the treatment accorded their depreciation counterparts in the borrowing alternative. The overall lease present value was obtained by deducting the present value of these imputed tax savings from the outlay cost previously determined. This process is summarized in Table 3.

TABLE 3

LEASING CASH FLOWS – VANCIL

PV of lease payments discounted at 8%							$12,165
Year	Lease rent	Balance of loan	Interest on loan at 8%	Non-interest lease rentals	Tax savings on non-interest lease rentals	PV of savings at 12%	
0	–	$12,000	–	–	–	–	
1	$6,822	6,138	$960	$5,862	$1,466	$1,309	
2	6,822	–	491	6,331	1,583	1,262	$2,571
				Net present value			$ 9,594

It does not diminish Vancil's substantial achievement to say that his solution bears an obvious debt to McEachron whose contribution, together with that of Gant, he praised (Vancil, 1963, p. 190). In their outcomes, the Vancil and (adapted) McEachron solutions differ only in one minor respect: McEachron's interest tax savings were calculated with reference to a loan of $12,165; Vancil's to a loan of $12,000.

It is noteworthy that in terms of discount rates, the McEachron and Vancil solutions are hybrids: Lease rentals and loan payments are discounted at the pre-tax borrowing rate; tax savings and other cash flows at the cost of capital.[3] In utilizing the borrowing rate for the financing flows, Vancil departed subtly from his earlier advocacy (albeit in connection with financial statement analysis) of the rate implicit in the lease.

Bierman and Smidt

In Bierman and Smidt (1960) leasing was mentioned only in a brief overview of investment analysis, and it was Bierman (1963) who first presented a lease solution, essentially a simplified version of McEachron's approach. Subsequently the Cornell pair must have reconsidered this issue because in the short chapter on leasing in Bierman and Smidt (1966) they departed from the dual interest rates of McEachron and Vancil (whose work they also cited).

Focusing solely on the evaluation of financial leases, they referred to the nature of these agreements only perfunctorily, asserting that 'many . . . are very similar to debt' (Bierman and Smidt, 1966, p. 218). Using a single discount rate, the borrowing cost, for all cash flows, their solution was further simplified when the asset's cash price was used to represent the amount borrowed. The possibilities of this short cut, which obviated the need for an alternative borrowing schedule to compare with leasing, were obvious from Vancil's solution. Bierman and Smidt justified this apparent financial sleight of hand, by which the particular pattern of loan repayments is ignored, on the following grounds:

---

[3] With his preference for IRR, McEachron never specified the discount rate appropriate for NPV calculations. However the emphasis he placed on the use of the cost of capital as a yardstick for IRR comparisons is compelling evidence that he would have used cost of capital.

> In general, if the discount rate used in the analysis is the same as the interest rate that the firm would have to pay if it actually attempted to finance the purchase of the asset by a loan, the particular loan repayment schedule chosen will not affect the present value of the loan. (1966, p. 220)

This principle was then extended to discount rates and cash flows both expressed on an after-tax basis. Bierman and Smidt used several alternative forms of presentation. Table 4 compares the two sets of cash flows employing one of their formats. All discounting is performed using the after-tax borrowing rate of 6 per cent.

TABLE 4

LEASE ANALYSIS—BIERMAN AND SMIDT

Borrow and buy		*Lease*	
PV of principal and after-tax payments at 6%	$12,000	Annual lease rentals	$6,822
		Tax deductions	(1,706)
PV of annual depreciation tax savings ($1500) at 6%	(2,750)	After-tax rentals	$5,116
PV of after-tax loan	$ 9,250	PV or annual after-tax lease rentals at 6%	$9,380

Despite its striking simplicity, and its place in a work much quoted in other respects, Bierman and Smidt's solution remained virtually unnoticed if subsequent literature citations are any guide. The brevity of their discussion, and their largely intuitive reasoning, may have alienated readers seeking a more rigorous basis for a solution.

Weston and Brigham

Weston and Brigham's (1966) lease solution resembled Vancil's in using both borrowing and cost of capital rates, although the application of these rates differed somewhat. In their solution they assumed the existence of a specific loan agreement which could be compared with leasing. The borrowing rate was introduced into cash flows directly through interest payments rather than indirectly by discounting. The actual mechanics of their method are straightforward and need only be described. From annual payments for debt principal and interest, tax savings on interest and depreciation were deducted to give annual after-tax costs of ownership. These ownership outlays were then offset against after-tax lease payments to give the net advantage or disadvantage of owning, this amount being converted to a present value by discounting at the cost of capital.[4]

---

[4] Careless readers may have been misled on this point because Weston and Brigham used the same rate, 5 per cent, as the pre-tax borrowing rate, implicit cost of leasing, and after-tax cost of capital, in their illustrative example. Although they referred to Gant (1959) and Vancil and Anthony (1959), they ignored Vancil (1961a, 1961b, 1963). In fact, their method is essentially Gant's, with the final cash flows, undiscounted by Gant, discounted at the cost of capital.

In Weston and Brigham (1969) the after-tax borrowing rate rather than the cost of capital was used to discount the differential cash flows of borrowing and leasing. Influenced by Bowlin (1966) they emphasized the similar risk characteristics of leasing and borrowing to justify discounting by the borrowing rate, saying that:

> in comparing two financial alternatives there is essentially no risk to the firm in obtaining the savings attributable to one alternative over the other. This being the case, a discount rate which reflects a low risk is preferable to one that reflects the firm's average risk. For this reason we . . . use the after-tax debt rate rather than the weighted average cost of capital. (1969, p. 536n)

Beechy

Vancil's solution was subsequently summarized by Ferrara (1966) and adapted by Beechy (1969) with a minor error corrected (Beechy 1970) following criticism by Mitchell (1970). Seemingly unaware of Bierman and Smidt's contribution, Beechy departed from Vancil in two crucial respects. He switched from NPV analysis to IRR, reasoning that 'managers are more accustomed to thinking in terms of interest rates when considering financial alternatives' (1969, p. 379). He assumed that all cash flow differences between leasing and borrowing were 'financing' flows.

Beechy contrived the debt repayment schedule required for IRR using a technique devised by Bower, Herringer and Williamson (1966) in which debt outlays are prorated against lease payments. These amounts will differ only if a lessor's premium is present. In our earlier example, the $12,000 loan has a leasing counterpart of $12,165, giving a ratio of 0.98636 between borrowing and leasing. Applying this ratio to annual lease rentals, $6,822, gives equivalent annual loan repayments of $6,729. Apportioning these loan repayments between interest and principal in a similar manner to Vancil, Beechy then compared the tax deductions associated with this loan with the tax deductions obtainable if the same imputed loan were treated as a lease. Over the life of this 'loan' this amount would be zero but the timing of deductions caused differences between periods. The actual lease payments were then adjusted for these timing effects to give the net lease cash flow. By interpolation the rate of interest which equated the lease cash flows with the cash cost of the asset was calculated. This rate, 9.03 per cent in our example, could then be compared with the pre-tax borrowing cost of 8 per cent. This rather complicated procedure is depicted in Table 5.

TABLE 5

LEASE ANALYSIS—BEECHY

Year	Depreciation plus interest	Equivalent loan repayments	Differential effect	Tax payments	Lease rentals	Net lease cash flow	PV of lease cash flow at 9.03%
1	$6,960	$6,729	($231)	($58)	$6,822	$6,880	$ 6,310
2	6,498	6,729	231	58	6,822	6,764	5,690
							$12,000

Responding to Mitchell's criticisms of this IRR emphasis, Beechy replied that his method (and a Mitchell variant) 'can . . . be used as NPV methods; all that need be done is discount the final, adjusted cash flows at a rate equal to the marginal cost of borrowing and a net present value is obtained which can be compared among alternatives' (1970, p. 773).

Of Vancil's direct successors, Beechy alone specified why he rejected dual discount rates in favour of the borrowing rate, arguing that 'the cost of capital . . . is the *result* . . . not the *cause* of financing decisions' (1969, p. 376). Commenting directly on Vancil's approach Beechy wrote, 'it is a little difficult to justify conceptually the division of the cash effects of the lease . . . It should be possible to evalutate the lease independently of the investment cut-off rate' (p. 377).

Middleton

Probably the first widely accessible Australian work on DCF analysis, Middleton (1960) had its genesis in pleas for guidance on capital budgeting methods by delegates to the Australian Society of Accountants' 1958 Convention. With technical material largely drawn from Dean (1951), Terborgh (1958), Grant and Ireson (1960), and with a section on the replacement problem contributed by F. K. Wright, the text was enhanced by Middleton's lucid exposition of these new ideas.

In a section entitled 'Rent or Buy' the outright purchase of an asset was compared with renting under a lease agreement. As to the discount rate appropriate for this purpose Middleton declared: 'Generally speaking, the appropriate rate would be based either on the net cost of borrowing the initial sum for an outright purchase, or, if funds are already available, the cost of capital' (1960, p. 32). Equivocal, even naive, as this passage seems now, its significance is that when Middleton considered the most likely circumstances in which leasing would be envisaged – when a firm lacked the ready funds to purchase an asset – he sensed that leasing and borrowing were alternatives and that, in this event, the appropriate discount rate was the borrowing rate.

Middleton (1971), influenced by Vancil, Ferrara, Beechy and Mitchell, presented an NPV lease solution using the after-tax borrowing rate for all discounting. Reflecting Vancil's influence, he employed the cash price of the asset to represent the present value of an alternative borrowing stream. In Middleton (1972) this material was repeated, augmented by an unusually realistic problem based on a leasing contract for a $A1.6 million computer which had been offered to Middleton's then employer, Melbourne University. This problem included a residual value, a practical complication ignored by most earlier writers. It was to be used later by at least five other authors, (Bloomfield and Ma, 1974; Grinyer, 1975; Hawkins, 1976; Bowles, 1977; and Burrows, 1977), always with a different solution.[5]

Middleton's solution shared a theoretical deficiency with earlier versions of this approach. To the extent that the annual cash flows of borrowing and leasing diverged, a firm's financial structure also diverged. This was most clearly demonstrated in Beechy's solution, in which the presence of a lessor's premium automatically caused leasing and borrowing cash flows, and the associated capital structures, to differ. This problem was obscured in the Bierman-Smidt-Middleton solutions which required no specific debt alternative, but the implication of their approach was that any difference between leasing and borrowing outlays would be discounted at the borrowing rate. Weston and Brigham (1969), although addressing this issue, ignored the fact that even minor cash flow differences between the alternatives implied subtle capital structure divergences. Critics such as Bowles (1977) focused on this point, arguing that the resulting change in capital structure, even if only minor, necessitated the application of a discount rate representative of the capital structure. In the simplest case this would be the cost of capital.

---

[5] Grinyer alone of all the authors surveyed for this article acknowledged the contribution of Bierman and Smidt. Several other solutions in this sequence were merely variations on familiar themes: Burrows' was yet another 'hybrid' approach, while Bowles' was a more sophisticated version of Weston and Brigham (1966) which they had subsequently rejected.

Myers, Dill and Bautista

While denying that they presented any originality of approach or conclusions, MDB did lay claim to a 'more complete and rigorous analysis than was provided by . . . other writers' (1976, p. 799). MDB advanced the leasing debate on three fronts: They provided a more rigorous basis for the 'authoritative' solution, already ten years old; they showed how differing tax rates levied on lessor and lessee created an economic basis for leasing; and they evolved an approach for equating the capital structures associated with leasing and borrowing. MDB's treatment of the capital structure issue can be demonstrated by formulating the direct cash flow consequences of leasing—after-tax lease payments plus depreciation tax deductions forgone—for our simple problem. Table 6 shows these cash flows.

TABLE 6

DIRECT CASH FLOW CONSEQUENCES OF LEASING

	YEAR	
	1	2
Lease payments	$6,822	$6,822
Tax savings on lease payments	(1,706)	(1,706)
Depreciation tax deductions forgone	1,500	1,500
Net cash flow	$6,616	$6,616
PV of cash flows at 6%	$6,242	$5,888

Whereas Middleton, who had formulated cash flows in a similar manner, was concerned only with their total present value of $12,130, to MDB capital structure considerations made each year's amount crucial. They argued that the debt capacity displaced in any year by the lease was equal to the direct lease cash flows, both amounts specified in present value terms. The corollary was that the present value of any equivalent loan should also be equal to this amount.

MDB's cash flows were thus a special case of the Bierman-Smidt-Middleton position but they gave it theoretical underpinning by showing that, providing it was possible to construct a loan with cash flows each year identical to those of the lease, there could be no objection on capital structure grounds to discounting by the after-tax borrowing rate. However, while MDB had conceptualised a solution they gave no practical guidance on how to formulate a borrowing alternative with the same present value as the lease. Subject to one qualification, this problem was solved by Franks and Hodges (1978).

Relating the lease present value of $12,130 to the subsequent annual lease cash flows of $6,616, Franks and Hodges disaggregated each year's cash flows into equivalent amounts of principal, interest and interest tax savings, to produce a loan with cash flows identical to those of the lease. This process is depicted in Table 7.

TABLE 7

LOAN EQUIVALENT TO DIRECT LEASE CASH FLOWS

	YEAR		
	0	1	2
Amount borrowed at start of next year	$12,130	$6,241	–
Interest at 8%		970	$ 499
Tax savings on interest		(243)	(125)
Principal repaid		5,889	6,241
Net cash flow		$6,616	$6,616

Because the net cash flows were identical, a firm would be indifferent as to whether it borrowed or leased. But either alternative would mean forgoing another loan requiring it to borrow only $12,000 rather than the $12,130 effectively obtained by leasing. In simple terms, borrowing was cheaper than leasing.

Abetted by Franks and Hodges, MDB had confirmed the intuition underlying the earlier Bierman-Smidt-Middleton solutions. MDB also showed that the solutions of Beechy, and Weston and Brigham, in which borrowing and leasing cash flows were similar, had considerable rigour. However, MDB and Franks and Hodges had not completely solved the problem of the discrepancy between annual leasing and borrowing cash flows. Both sets of authors had based their analysis on the assumption of immediate tax relief on interest payments. Although Franks and Hodges (1979) illustrated an alternative borrowing schedule incorporating a lagged tax effect they did not indicate how these payments had been calculated (iteration is an obvious possibility).

MDB's Alternative Approach

Deriving their preliminary solution, MDB assumed that a firm borrowed 100 per cent of the value of depreciation and interest tax shields. Uncomfortable about this point they sought further insights by examining the lease cash flows from the lessor's standpoint, concluding that

> The corresponding assumption for the lessor is 100 per cent debt financing, which is evidently unrealistic. It is hard to see how any company, even one whose only assets are blue chip leases, could operate at 100 per cent debt. Even the safest financial intermediary requires *some* equity. (1976, p. 806)

This reasoning led to a variation of the original solution, in which the discount rate was increased to reflect the fact that tax shields, including interest tax deductions, would not support 100 per cent debt. MDB then concluded that the cost of capital was the appropriate rate since lease finance, when examined from the lessor's standpoint, would involve both debt and equity funds. Later they equivocated, conceding that 'intuition suggests . . . that a dollar of lease liability supports or displaces a dollar of debt' (p. 816). Ultimately they left this issue unresolved.

Examining leasing from the lessor's position yields useful insights, but wrongly specified it can lead to error. When MDB moved from the lessee's position to the lessor's, they simply redesignated cash flows and discount rate to identify them with the lessor. Thus, the cost of debt to the lessee became the cost of debt to the lessor. What they overlooked was that to the lessor, the lease was an investment, to be discounted at the appropriate cost of capital. Thus the discount rates that MDB should have equated were the lessor's cost of capital and the lessee's cost of debt.

Referring to financial intermediation in general, Weston and Brigham (1981) argued that an intermediary's cost of capital is manifested as a borrower's cost of debt. This implies that an intermediary lending to a client, ostensibly against the security of an asset, undertakes a lower level of business risk than the client investing in the same asset. Gant provided a partial explanation for this risk asymmetry: 'The investor in a lease financing transaction looks more to the general credit of the company for his investment security than to the value of the property involved' (1959, p. 123).

In some circumstances, the security for the lessor's investment may extend beyond the lessee's disclosed assets. An actual lease agreement illustrates this point. In 1977 a Melbourne radiological medical partnership leased a $A600,000 CAT scanner. The partners had to provide joint and separate guarantees, a lien over book debts, and an undertaking to observe minimum financial ratios.[6] In effect, the partnership was compelled to provide additional security to the lessor in the form of outside assets, implying a matching equity injection in an off-balance sheet form.

MDB's elementary error in switching discount rates led them to query whether lease cash flows could support an equivalent amount of debt. They could have asked the same question about debt itself. Can debt-related cash flows support other debt? Carried to the point of absurdity, this line of reasoning would demonstrate that debt itself was impossible. MDB's intuition that their alternative approach was flawed was well founded.

CONCLUSION

Discounted cash flow methods of lease analysis are scarcely three decades old, and it is only twenty-two years since the 'authoritative' solution appeared. Its antecedents lie in the works of Gant (1959) and McEachron (1959). In one branch of its development, McEachron initially stimulated Bierman (1963) and ultimately Bierman and Smidt (1966) who made the first formal presentation of this solution. In a second branch, Vancil (1961a, 1961b, 1963) applied his own stamp to the earlier work of Gant and McEachron to influence Weston and Brigham (1969), Beechy (1969, 1970) and Middleton (1971) who all produced versions of this solution. That the first branch petered out and that it was the second which proved resilient and persuasive, does not diminish the historial place of Bierman and Smidt. If the solution which they first presented is indeed 'authoritative' and if fairness has any place in scholarship, it is their role, unique and unchallengeable, that should always be cited in this connection. Assuming that the neglect of their achievement has not been wilful, it can only be conjectured that many of their readers wrongly considered their disarmingly simple exposition to be simplistic, and overlooked its underlying power. With assumptions and conclusions generally unsympathetic to the view of leasing promulgated by the finance industry, it is little wonder their approach was ignored in that quarter.

---

[6] The author's advice was sought on this proposal, the first private purchase in Australia of this high technology equipment.

Despite its vintage this solution achieved intellectual respectability only with the publication of MDB's wide-ranging article. While their exposition of taxation and capital structure aspects of leasing makes MDB more than mere popularizers of this solution, in one respect their scholarly luck has been remarkable. A fundamental flaw in their own preferred approach to lease evaluation has either been charitably ignored or puzzlingly overlooked by a host of distinguished readers.

This leasing saga contains familiar scholarly ingredients: a practical problem initially faced by practitioners and solved in a limited way,[7] the involvement of academics; disagreement over basic concepts; intellectual wrong turns; and similar solutions evolving independently in response to similar problems. Its fascination lies in seeing how an idea develops, how it is gradually refined, and how it blossoms into received wisdom.

REFERENCES

Beechy, T. H., 'Quasi-Debt Analysis of Financial Leases', *The Accounting Review*, April 1969.

———, 'The Cost of Leasing: Comment and Correction', *The Accounting Review*, October 1970.

Bierman, H., Jr, *Topics in Cost Accounting and Decisions*, McGraw-Hill, 1963.

Bierman, H., Jr, and S. Smidt, *The Capital Budgeting Decision*, MacMillan, 1960; 2nd edn, 1966.

Bishop, S. R., H. R. Crapp, and G. J. Twite, *Corporate Finance*, Holt, Rinehart and Winston, 1984.

Bloomfield, E. C., and R. Ma, 'The Lease Evaluation Solution', *Accounting and Business Research*, Autumn 1974.

Bower, R. S., F. C. Herringer, and J. P. Williamson, 'Lease Evaluation', *The Accounting Review*, April 1966.

Bowles, G. N., 'Some Thoughts on the Lease Evaluation Solution', *Accounting and Business Research*, Spring 1977.

Bowlin, O. D., 'The Refunding Decision: Another Special Case in Capital Budgeting', *Journal of Finance*, March 1966.

Brealey, R., and S. Myers, *Principles of Corporate Finance*, McGraw-Hill, 1981.

Burrows, G. H., 'The Lease Evaluation Solution: A Further Comment', *Accounting and Business Research*, Summer 1977.

Dean, J., *Capital Budgeting*, Columbia University Press, 1951.

Ferrara, W. L., 'Should Investment and Financing Decisions Be Separated?', *The Accounting Review*, January 1966.

Franks, J. R., J. E. Broyles, and W. T. Carleton, *Corporate Finance*, Kent Publishing, 1985.

Franks, J. R., and S. D. Hodges, 'Valuation of Financial Lease Contracts: A Note', *Journal of Finance*, May 1978.

Franks, J. R., S. D. Hodges, 'The Role of Leasing in Capital Investment', *National Westminster Bank Quarterly Review*, August 1979.

Gant, D. R., 'Illusion in Lease Financing', *Harvard Business Review*, March-April 1959.

———, 'A Critical Look at Lease Financing', *The Controller*, June 1961.

Grant, E. L., and W. G. Ireson, *Principles of Engineering Economy*, Ronald Press, 1960.

[7] McEachron (1986) hints at the sophisticated state of other early practice when he acknowledged that after delivering his 1959 paper, he learned that a rival oil company had independently developed a similar lease evaluation approach.

Grinyer, J. R., 'The Lease Evaluation Solution: A Comment and Alternatigve', *Accounting and Business Research*, Summer 1975.

Hawkins, C. A., 'The New Orthodoxy in the Lease or Buy Decision', *Australian Accountant*, January-February 1976.

Howard, P., 'Financial Lease Analysis: Consistent and Inconsistent Approaches', *Accounting and Finance*, November 1983.

McEachron, W. D., 'A Discounted Cash Flow Approach to Long-Term Leasing Evaluations', American National Meeting of the Institute of Management Sciences, 5 June 1959.

———, 'Leasing: A Discounted Cash Flow Approach', *The Controller*, May 1961.

———, Letter to Harold Bierman, Jr, 23 November 1986.

Middleton, K. A., *The Economics of Capital Expenditure*, Australian Society of Accountants, 1960; 2nd edn, Butterworths, 1971.

———, 'The Evaluation of Leasing Proposals', *Australian Accountant*, April 1972.

Mitchell, G. B., 'After-Tax Cost of Leasing', *The Accounting Review*, April 1970.

Myers, S. C., D. A. Dill, and A. J. Bautista, 'Valuation of Financial Lease Contracts', *Journal of Finance*, June 1976.

Terborgh, G., *Business Investment Policy*, Machinery and Allied Products Institute, 1958.

Vancil, R. F., 'Lease or Borrow – New Method of Analysis', *Harvard Business Review*, September-October 1961a.

———, 'Lease or Borrow – Steps in Negotiation', *Harvard Business Review*, November-December 1961b.

———, *Leasing of Industrial Equipment*, McGraw-Hill, 1963.

Vancil, R. F., and Robert, N. Anthony, 'The Financial Community Looks at Leasing', *Harvard Business Review*, November-December 1959.

Van Horne, J., R. Nicol and K. Wright, *Financial Management and Policy in Australia*, Prentice-Hall, 1985.

Weston, J. F., and E. Brigham, *Managerial Finance*, Holt, 2nd edn, 1966; 3rd edn, 1969; 7th edn, 1981.

Zises, A., 'Re: "Illusion in Lease Financing"', *Harvard Business Review*, May-June 1959.

———, 'Critical of a "Critical Look . . ."', *The Controller*, September 1961.

ABACUS, Vol. 24, No. 2, 1988

ROBERT J. BRICKER

Knowledge Preservation in Accounting: A Citational Study

This study explores knowledge preservation in accounting research through an examination of a sample of 428 published accounting articles and their nearly 11,000 citations. The examination shows that accounting scholars tend to cite very recent literature. The small volume of cited pre-1960 literature (preponderantly from non-accounting sources) and the low incidence of historical research articles in most non-historical journals suggests that earlier accounting knowledge may become lost to future generations of accounting scholars. This conclusion implies that accounting scholars can play an important role in the preservation and dissemination of previous generations of accounting knowledge.

Key words: Accounting; Knowledge; Research.

In his article entitled 'The Need For A Theory of Citing', Blaise Cronin evocatively wrote:

> citations are frozen footprints in the landscape of scholarly achievement; footprints which bear witness to the passage of ideas. From footprints it is possible to deduce direction; from the configuration and depth of the imprint it should be possible to construct a picture of those who have passed by. (1981, p. 16)

Using a set of published accounting articles and their bibliographic citations, this study explores several of Cronin's themes. Specifically this research examines how knowledge is preserved in accounting research, the extent of use and sources of older literature in current accounting research, and the related journal differences. The role of accounting history in non-historical accounting journals is also examined. These themes will be operationally explored in an analysis which reveals: (a) the age distribution pattern of all of the citations; (b) the occurrence of historical articles and their distribution by journal; (c) the distribution of all cited documents which were published before 1960 by citing journal; and (d) the extent of accounting versus non-accounting literature in the pre-1960 citations.

This study helps accounting scholars understand and critically evaluate how knowledge from previous research and literature is incorporated into current research, the extent to which early research remains explicitly significant in current research, the potential importance of the preservation of this knowledge, and the role that accounting scholars can play in the preservation of this knowledge.

ROBERT J. BRICKER is Assistant Professor of Accounting and MIS, Ohio State University, Ohio.

The author acknowledges the assistance of Gary Previts, Robert Colson, Larry Parker and Paul Salipante; and the financial assistance of the Deloittes, Haskins & Sells Foundation.

The balance of this paper reviews some related literature and the formulation of some general hypotheses. Then, the data and methods are reviewed, followed by a discussion and explanation of the results. The final section presents some concluding remarks.

LITERATURE REVIEW AND GENERAL HYPOTHESES

How *should* accounting scholars cite prior literature? The sciences might suggest, on one hand, that if accounting research accumulates knowledge scientifically (meaning that every generation of research literature incorporates all the knowledge of prior generations), then there is no need to refer to any literature other than that which is immediately preceding. Thus references to previous literature simply disappear—not because the related knowledge is lost, but rather because it is subsumed in subsequent generations of literature. This phenomenon has been labelled 'obliteration by incorporation' (Merton, 1968).

However, it can be argued that the scientific model of knowledge accumulation is not appropriate for accounting research. Specifically, it may be conjectured that accounting knowledge does not develop in a completely evolutionary and progressive manner, as suggested by Stamp (1981). Old ideas and problems continually re-emerge in changing circumstances. Previous generations of literatures (and the ideas and knowledge contained therein), which may lose relevance for an extended period of time, may once again *gain* relevance. If this model more accurately portrays the condition of knowledge accumulation in accounting, then Santayana's (1906) maxim, 'Those who cannot remember the past are condemned to repeat it', deserves careful thought.

To explore how accounting research accumulates knowledge and preserves ideas this study examines, in part, how accounting scholars actually do rely upon antecedent literature. In similar, previous research, for instance, scholars have addressed this issue through an examination of the citation age patterns of scholarly disciplines. This research has revealed that science-like disciplines have citation patterns which are much more recent than those found in the arts and humanities, corroborating the hypothesis of scientific knowledge accumulation introduced above (Cole, 1983).

In exploring the citation patterns of various scholarly disciplines, these studies have found that most documents which are written and published never get cited at all (Price, 1965). Of those which are cited, there occurs an initial impulse phase following publication, during which the citation frequency of the document increases rapidly to a peak at about three to five years, which thereafter decreases until it reaches a steady state after about ten years (Gamble and O'Doherty, 1987; Price, 1965). A small number of documents become citation classics and continue, even in the sciences, to be cited through the years.

Scholars who have studied the *underlying reasons* for document citation have found evidence which shows that citations often are measures of intellectual indebtedness (MacRoberts and MacRoberts, 1986). Intellectual indebtedness occurs when current research develops theories and models from previous disciplinary or interdisciplinary research. The citation is the outward manifestation of intellectual debt. However, most research also shows evidence of 'influences' on citations (introduced above) which are not explained by a simple model of intellectual indebtedness.

These influences have been explored by several scholars, including, recently, MacRoberts and MacRoberts (1986). From the accounting literature, the effect of these influences is summarized in Brown and Gardner (1985a). One result of these influences is the existence of citations to an older body of disciplinary and interdisciplinary literature (often to the previously mentioned 'citation classics'). These citations may often be deferential, made by those wishing to acknowledge the seminal work and ideas of earlier scholars, even though the 'intellectual indebtedness' to this earlier writer is indirect at most. However, other important reasons can be given for the citation of older literature. The citing document may itself be an historical work, and as such cites certain old documents for historical, rather than theoretical, reasons. Or it may be that the line of work carried on in the citing document has been dormant for an extended period of time and the immediately preceding generation of literature for its research area is much older than it is for other research areas.

In summary, scholarly disciplines which are science-like show a citation pattern favouring very recent literature, as suggested by the scientific model of knowledge accumulation. However, scholars of these disciplines are also influenced, for a variety of reasons, to cite earlier literature as well. It is conjectured here that accounting, which is at least science-like in its efforts to predict and explain certain phenomena, shows similar sorts of citation patterns. That is, most accounting citations will refer to a relatively recent body of literature, while a small body of older literature will comprise the set of 'citation classics'.

If this body of literature is found in this research to consist primarily of accounting documents, there would appear to be a reduced risk of the loss of previous accounting knowledge and ideas for future use. If, however, the classic literature is found to be primarily composed of documents from other disciplines, the risk of the loss of previous accounting knowledge and ideas would appear to be increased. Since it has not yet been clearly established that the scientific model of knowledge accumulation is appropriate for accounting research, such a finding would suggest an important role for accounting scholars in the preservation and dissemination of this knowledge.

DATA AND METHODS

Citational methods, generally, have been employed frequently in accounting research. An early application was McRae's article (1974) which examined the trading of ideas, as proxied by citations, between accounting and other disciplines. More recently, Brown and Gardner used a citational data base to assess the impact of journals on accounting research (1985b) and to evaluate the contributions of accounting faculty and doctoral programs (1985a). In 1987, Gamble and O'Doherty introduced cocitation analysis to accounting in an article which examined the development of agency thought. Similarly, Bricker (1987) used cocitation clustering to infer an intellectual structure for the accounting discipline.

The data used in this research was obtained from the Social Science Citation Index (SSCI) and consisted of the 428 main articles and their 10,938 citations from six scholarly accounting journals for the period from 1983 through the first quarter of 1986. These journals were *Abacus* (ABAC), *Accounting, Organizations, and Society* (AOS), *Accounting Review* (AR), *Journal of Accounting and Economics* (JAE), *Journal of Accounting and Public Policy* (JAPP) and *Journal of Accounting Research* (JAR). These were all of the mainstream, scholarly accounting journals covered by the SSCI. From the 10,938 citations, 10,911 were usable for further analysis. The distribution of main articles and citations among the set of source journals is given in Table 1.

TABLE 1

DISTRIBUTION OF MAIN ARTICLES AND CITATIONS AMONG SOURCE JOURNALS

Journal	Main articles	Citations
Abacus (ABAC)	27	735
Accounting, Organizations, and Society (AOS)	69	2,831
Accounting Review (AR)	127	3,000
Journal of Accounting and Economics (JAE)	34	679
Journal of Accounting and Public Policy (JAPP)	50	1,443
Journal of Accounting Research (JAR)	111	2,250
Total	428	10,938

The analysis of the data began with the categorization of each citation into either the pre-1960 group or the post-1959 group and the categorization of the main articles into either the historical or non-historical group, as determined by examining the title of the article. This was followed with a description and discussion of the overall age distribution and a computation of the average age of the citation sample and a comparison of this number with those of other scholarly disciplines.

For this research, a citation classic was defined as any pre-1960 cited document. In examining the patterns of occurrence of the classic literature, the frequency of pre-1960 citations in all articles was calculated and analysed. A chi-square distribution test was used to compare the occurrence of these articles between journals. The results of such an analysis, however, might have been somewhat misleading since the set of citing articles would presumably include a number of historical articles whose references to pre-1960 literature would be largely historical rather than theoretical in nature. In addition, the variations in the occurrence of historical articles among journals might have been able to account for their general differences in the occurrence of pre-1960 citations.

To eliminate this effect, historical articles and their pre-1960 citations were separated from non-historical articles and their pre-1960 citations. This permitted an examination of the citation-age patterns of the non-historical articles. The occurrence of pre-1960 citations in non-historical articles was then examined. Specifically, the average age of the citation sample was recomputed and the occurrence of pre-1960 citations was compared among journals, again using a chi-square distribution test.

Finally, the nature of pre-1960 (classic) citations from non-historical articles was examined. Each of these citations was first categorized as to source: accounting, non-accounting—theoretical (borrowing a model or theory from another discipline), and non-accounting—methodological (borrowing methods of inquiry such as statistical or mathematical methods from another discipline). The significance of the differences between these citation patterns among the six journals was tested using a chi-square distribution test, after eliminating the differences in the occurrence of pre-1960 citations among the journals. (This eliminated the differential citation-age effect between journals.)

ANALYSIS OF RESULTS: CITATION AGE PATTERNS

The age distribution of the citations is given in Table 2 and Figure 1. Table 2 gives the distribution of the citations by decade. Nearly 94 per cent of all citations referred to documents published from the period from 1960 through 1985. Thus only 652, or about 6 per cent, of all citations were to documents published prior to 1960, and of these, half were citations to documents published during the 1950s.

The distribution of these 652 citations among source journals is given in Table 3. The frequency of occurrence of pre-1960 citations in journal articles ranged from an average of one-half in JAE and JAR to four in ABAC. Similarly, the occurrence of old citations among all citations ranged from 2 per cent in JAE and JAR to 15 per cent in ABAC. Overall, the data sample contained 652 pre-1960 citations, which is an average of 1.5 citations per source article and represented about 6 per cent of the entire sample of citations.

The preceding discussion establishes that accounting scholars tend to cite a relatively recent body of literature; 94 per cent of the citations are documents published after 1959 and over 80 per cent are documents published during the 1970s and 1980s. The recency of citations in this sample of the accounting literature, however, is not as pronounced as in some other science-like disciplines. The average age of the entire sample of accounting citations in this research was computed to be approximately

TABLE 2

FREQUENCY AND PROPORTION OF CITATIONS BY DECADE

Decade	Number	Proportion	Cumulative proportion
pre 1900	67	.006	.006
1900-1909	20	.002	.008
1910-1919	25	.002	.010
1920-1929	45	.005	.015
1930-1939	103	.009	.024
1940-1949	71	.007	.031
1950-1959	321	.029	.060
1960-1969	1,242	.114	.174
1970-1979	5,329	.488	.662
1980 on	3,643	.334	.996
undated	45	.004	1.000
Total	10,911	1.000	1.000

FIGURE 1
DISTRIBUTION OF CITATIONS BY YEAR

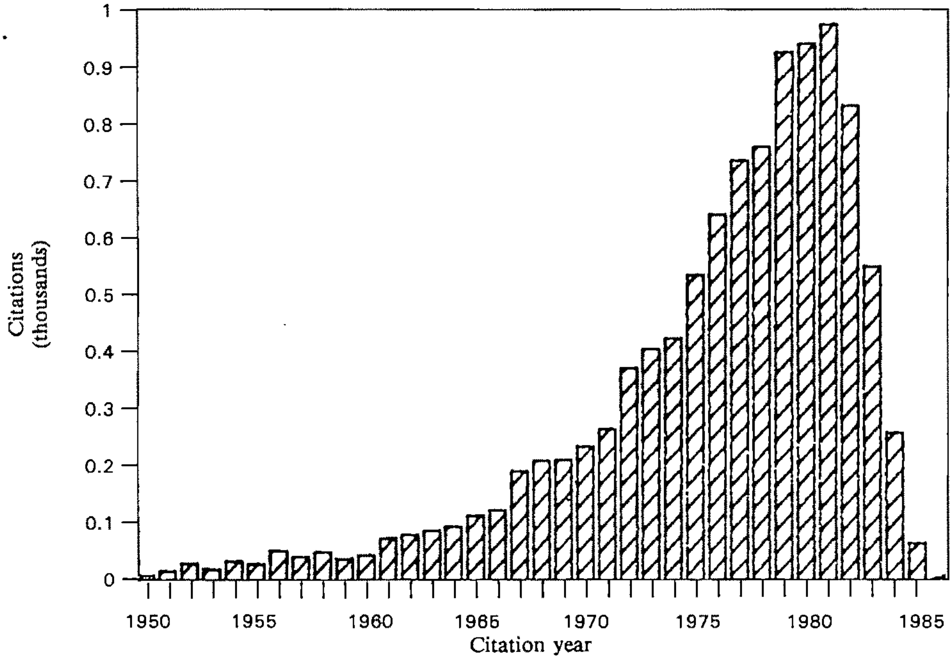


TABLE 3
DISTRIBUTION OF PRE-1960 CITATIONS AMONG SOURCE JOURNALS

Journal	Pre-1960 citations	Per main article	% of all citations
ABAC	108	4.0	15
AOS	191	2.8	07
AR	155	1.2	05
JAE	16	0.5	02
JAPP	127	2.5	09
JAR	55	0.5	02
Total	652	1.5	06

eleven years, which is higher than the average age of biological and physical science citations and the social sciences (four and seven years respectively; Crawford and Crawford, 1980). Even after eliminating the pre-1960 citations of the historical articles, the average age of the remaining citations was computed to be about 9.25 years, which is still higher than most other social and physical sciences. Three conjectures may form the basis of an explanation for this finding. It may be that accounting scholars deferentially cite their predecessors more frequently than do scholars of other disciplines. Or, accounting may accumulate knowledge in a manner that borrows more heavily from that of the arts and humanities (which also have an older citation pattern). Or it may be that accounting, as an academic discipline, is still so young that it has not yet developed an immediately preceding body of research which can, by itself, support the accounting research front.

As expected, the set of 428 accounting articles included a number of historical articles. In addition, variations in the occurrence of historical articles among journals were apparent in Table 3. These factors could have caused the different journal rates of occurrence of pre-1960 citations. To eliminate this effect, separate analyses of the pre-1960 citations of the historical articles and non-historical articles were performed. Table 4 shows the occurrence of pre-1960 citations among historical and non-historical articles. While only 15, or slightly more than 3 per cent, of all articles were historical, 246, or nearly 38 per cent of the pre-1960 citations were contained in the historical articles.

TABLE 4

OCCURRENCE AND DISTRIBUTION OF HISTORICAL AND NON-HISTORICAL RESEARCH ARTICLES AND THEIR PRE-1960 CITATIONS

	Historical articles			Non-historical articles	
Journal	Number	Proportion	Pre-1960 citations	Number	Pre-1960 citations
ABAC	6	.2222	78	21	30
AOS	5	.0725	52	64	139
AR	3	.0236	53	124	105
JAE	0	.0000	0	34	16
JAPP	1	.0200	66	49	61
JAR	0	.0000	0	111	55
Total	15	.0350	246	413	406

Examination of the historical articles showed differences in both their absolute frequency and proportion among the journals. Most of these differences were previously noted by Dyckman and Zeff (1984), who found, for instance, the complete disappearance of historical articles from JAR. Dyckman and Zeff's research also allows an interesting comparison among some of the other journals across time periods. In the pre-1970 time periods studied by Dyckman and Zeff, 13% of JAR's, 3% of the AR's, and 25% of ABAC's article space was devoted to historical articles. In the sample of articles included in the current study, more than 22% of ABAC's articles and just under 2.5% of AR's articles are historical, which is just slightly less than their fraction of article space in the earlier period, while JAR's historical articles (and article space) fell to zero.

A chi-square distribution test was used to test the statistical significance of the differences between the journals' pattern of publishing historical articles. This was accomplished by comparing the actual versus expected occurrence of historical articles by journal. The expected occurrence of historical articles by journal was calculated as a simple proportional distribution based upon each journal's actual total published articles. This is expressed, for each journal, as:

$$\text{EXPHIST}_j = \text{ARTICLES}_j / \sum_{i=1}^{n} \text{ARTICLES}_i \times \sum_{i=1}^{n} \text{HIST}_i \qquad (1)$$

where $EXPHIST_j$ is the expected occurrence of historical articles in journal j;
$ARTICLES_i$ or $_j$ is the number of articles in journal i or j;
$HIST_i$ is the number of historical articles in journal i;
i and j = 1 . . . 6, for each journal.

Table 5 shows that ABAC and AOS published several more historical articles than expected, while all the other journals, most noticeably AR and JAR, published one or more fewer historical articles than expected.

TABLE 5
ACTUAL AND EXPECTED OCCURRENCE OF HISTORICAL RESEARCH ARTICLES, BY JOURNAL

Journal	Actual articles	Proportion of all articles	Expected articles[a]
ABAC	6	.2222	1
AOS	5	.0725	2
AR	3	.0236	5
JAE	0	.0000	1
JAPP	1	.0200	2
JAR	0	.0000	4
Total	15	.0350	15

[a] By formula 1, rounded to nearest integer.

The chi-square statistic, comparing the differences between the actual and proportionally expected occurrence of historical articles by journal, was computed as 34.78, which is significant at a level of .01 (*df* = 5, *crit* = 15.09).

The historical articles and their citations were then removed to permit an examination of the extent to which accounting scholars rely upon pre-1960 literature in current non-historical accounting research. Table 6 shows, by journal, the average occurrence of pre-1960 citations in non-historical articles per non-historical article as well as the actual and expected overall occurrence of such citations. The expected occurrence of these citations for each journal is calculated as the proportion of each journal's total citations in relation to all citations, times the total of all pre-1960 citations from the set of all non-historic articles, which may be formally expressed as:

$$OLDEXP_j = CITES_j / \sum_{i=1}^{n} CITES_i \times \sum_{i=1}^{n} OLDCITES_i \qquad (2)$$

where $OLDEXP_j$ is the expected frequency of pre-1960 citations from the set of non-historical articles of journal j;
$CITES_i$ or $_j$ is the actual frequency of all citations of journal i or j;
$OLDCITES_i$ is the actual frequency of historical citations from the set of non-historical articles of journal i.

The frequency of pre-1960 citations is markedly reduced from Table 3 for both ABAC and JAPP, when the historical articles and their respective citations are

TABLE 6

DISTRIBUTION OF PRE-1960 CITATIONS AMONG SOURCE JOURNALS WITH PRE-1960 CITATIONS FROM HISTORICAL ARTICLES REMOVED

Journal	Actual pre-1960 citations	Per non-historical article	Expected pre-1960 citations[a]
ABAC	30	1.4	27
AOS	139	2.2	105
AR	105	.8	111
JAE	16	.5	25
JAPP	61	.5	54
JAR	55	.5	84

[a] By formula 2, rounded to nearest integer.

removed. Overall the citation patterns appear to be more similar among the journals, with the effect of the historical articles removed. Nevertheless, the occurrence of pre-1960 citations does show significant differences among the journals. Again using a chi-square test, and comparing the actual and proportionally expected occurrence of pre-1960 citations per Table 6, the computed chi-square statistic is 25.71 which is significant at a level of .01 (*df*=5, *crit*=15.09). The citation of earlier works in current writings appears to vary significantly across journals in our discipline.

ANALYSIS OF RESULTS: DISCIPLINARY DISTRIBUTION OF CITATIONS

Table 7 shows the distribution of pre-1960 citations from non-historical articles into three disciplinary categories: accounting, non-accounting—theoretical, and non-accounting—methodological.

TABLE 7

DISTRIBUTION OF PRE-1960 CITATIONS FROM NON-HISTORICAL ARTICLES BY DISCIPLINARY SOURCE

		Non-accounting		
Journal	Accounting	Theoretical	Methodological	Total
ABAC	5	24	1	30
AOS	8	111	20	139
AR	12	83	10	105
JAE	1	6	9	16
JAPP	10	43	8	61
JAR	4	31	20	55
TOTAL	40	298	68	406

It is evident from this table that pre-1960 citations are predominantly from non-accounting sources. Only about 10 per cent of these documents are explicitly accounting-related. This in itself may not be particularly surprising, for if accounting is science-like in its process of knowledge accumulation, then it is unnecessary for scholars to explicitly draw upon early research. In any case, the evidence shows that only occasionally are either substantive or deferential references made by accounting scholars to early accounting literature in current non-historical research.

Table 7 also shows that non-accounting citations are predominantly theoretical, as opposed to methodological, in nature. An exception to this is found in JAE, which has a larger number of methodological articles. The differences in the journal patterns of non-accounting citations were compared by measuring the differences in normalized actual interdisciplinary citation frequency and normalized expected interdisciplinary citation frequency. Actual interdisciplinary citation frequency was normalized for each journal by adjusting the pre-1960 citation occurrence frequency to the expected value, proportional to the citation frequency in each of the three categories, accounting, non-accounting – theoretical, and non-accounting – methodological. This is expressed as:

$$\mathrm{NORMCITES}_{jk} = \mathrm{OLDEXP}_{j}/\mathrm{OLDCITES}_{j} \times \mathrm{OLDCITES}_{jk} \qquad (3)$$

where NORMCITES$_{jk}$ is the normalized citation frequency for journal j for condition k;

k is a category corresponding to the three disciplinary categorizations: accounting, non-accounting – theoretical, and non-accounting – methodological, or a combination of categories;

OLDEXP$_{j}$ is the expected citation frequency for journal j, per formula 2;

OLDCITES$_{j}$ is the frequency of pre-1960 citations in the non-historical articles of journal i;

OLDCITES$_{jk}$ is the actual citation frequency for journal j, category k.

Using a chi-square distribution test, there was determined to be no significant difference among journal patterns of all non-accounting citations and non-accounting – theoretical citations. The results of this analysis are given in Table 8.

TABLE 8

CHI-SQUARES OF DIFFERENCES BETWEEN JOURNAL PATTERNS OF CITATIONS BY DISCIPLINARY SOURCE

	χ^2 computed	χ^2 critical ($s = .05$, $df = 5$)
Accounting citations	*	*
All non-accounting citations	0.77	11.07
Non-accounting theoretical citations	8.79	11.07
Non-accounting methodological citations	*	*

* Not computed because of small cell values.

This suggests that accounting and non-accounting – theoretical categories' citation patterns are also similar among journals (although these could not be directly tested because of limitations of the statistical method). It is posited that accounting scholars and journals are relatively similar in the way in which they draw upon early accounting literature (only occasionally) and non-accounting – theoretical and methodological literature (much more frequently).

Two independent conjectures may help to explain this phenomenon. Perhaps as a result of a lack of knowledge, scholars rely upon a well known piece of research in a field instead of more current research. They may have been schooled, for instance, using a particular text or document, and thus continue to use it during their subsequent research careers. Or, some research areas may implicitly adopt a particular set of interdisciplinary research works which had wide acceptance at the time of adoption. This may give these research areas a focal point and a commonly accepted theoretical base around which to conduct research.

CONCLUDING REMARKS

This study explored knowledge preservation in accounting research through an examination of a sample of 428 accounting journal articles and nearly 11,000 citations. The results are that most accounting citations are current; more than 80 per cent referred to documents published since 1970 while only about 6 per cent referred to documents published before 1960. The average age of the citation sample, after excluding pre-1960 citations from historical articles, was about 9.25 years, older than for most social and basic sciences. This finding suggests that the accounting discipline does accumulate knowledge in a manner similar to that suggested by the scientific model, although not as completely as many other science-like disciplines. The question of the propriety of the scientific model of knowledge accumulation, of course, remains debatable and unaddressed here.

It was also found that for non-historical articles, most pre-1960 citations were from non-accounting—theoretical sources, meaning that they represented the borrowing of well-established models and theories from other disciplines for use in accounting. This finding was consistent across journals. Therefore, the conjecture that these interdisciplinary theories and models (which are old by the standards of their own disciplines) provide focal points for the development of research areas, appears plausible, but requires further investigation.

The occurrence of pre-1960 citations among non-historical articles and the occurrence of historical articles varied significantly among journals. *Abacus* and *Accounting, Organizations and Society* both had the largest number of historical articles and the highest rate of pre-1960 citations among non-historical articles. This suggests that individual journals exhibit preferences in the articles they publish along dimensions related to both the historical nature of the article and the article's citation age pattern. Journals such as *Abacus* and *Accounting, Organizations, and Society,* both published outside the United States, appear to favour historical studies and articles that rely on early generations of accounting and non-accounting literature.

The small number of citations in non-historical articles to pre-1960 accounting documents suggests that accounting scholars deferentially cite early disciplinary literature only occasionally. This finding suggests an important role for a community of accounting scholars, educators, and journals in the preservation and dissemination of earlier accounting knowledge. Given the current low rate of historical articles published in most non-historical journals, and the possibility that the scientific model of knowledge accumulation is inappropriate for accounting research, it more firmly entrusts to them the responsibility for maintaining the knowledge and ideas of these earlier periods and scholars.

Although all of the accounting literature was not studied, the six journals included are assumed to be representative of mainstream accounting literature (Bricker, 1987). Nevertheless, some specific research areas such as taxation, history, and information systems are not well represented by this journal set, and there are arguably some other journals whose inclusion would give a better overall picture of the citation patterns of the entire discipline. This represents another possible future research opportunity. Finally, given the low frequency of citation of early accounting literature, future research might specifically identify and examine the early accounting literature which is still cited by contemporary scholars for theoretical purposes, and that which is not.

REFERENCES

Bricker, R. J., 'An Empirical Investigation of the Structure of Accounting Research', *Journal of Accounting Research*, (in press).

Brown, L. D., and J. C. Gardner, 'Applying Citation Analysis to Evaluate the Research Contributions of Accounting Faculty and Doctoral Programs', *The Accounting Review*, April 1985a.

Brown, L. D., and J. C. Gardner, 'Using Citation Analysis To Assess The Impact Of Journals And Articles On Contemporary Accounting Research (CAR)', *Journal Of Accounting Research*, Spring 1985b.

Brown, L. D., and J. C. Gardner, 'Research In Psychiatry: A Co-Citation Analysis', *American Journal of Psychiatry*, January 1980.

Cole, S., 'The Hierarchy of the Sciences', *American Journal of Sociology*, Vol. 89, No. 1, 1983.

Crawford, J. W., and S. Crawford, 'Research in Psychiatry: A Co-citational Analysis', *American Journal of Psychiatry*, January 1980.

Cronin, B., 'The Need For a Theory of Citing', *Journal of Documentation*, March 1981.

Dyckman, T. R., and S. A. Zeff, 'Two Decades of the Journal of Accounting Research', *Journal of Accounting Research*, Spring 1984.

Gamble, G. O., and B. O'Doherty, 'The Development of Agency Thought: A Citation Analysis of the Literature', *Accounting Historians Journal*, Spring 1987.

MacRoberts, M. H., and B. R. MacRoberts, 'Quantitative Measures of Communication in Science: A Study of the Formal Level', *Social Studies of Science*, Vol. 16, 1986.

McRae, T., 'A Citational Analysis of the Accounting Information Network', *Journal of Accounting Research*, Spring 1974.

Merton, R. K., *Social Theory and Social Structure*, Free Press, 1968.

Price, D. J., 'Networks Of Scientific Papers', *Science*, 149, 1965.

Santayana, G., *The Life of Reason: Vol. 1. Reason in Common Sense*, 1906.

Stamp, E., 'Why Can Accounting Not Become A Science Like Physics?', *Abacus*, June 1981.

ABACUS, Vol. 24, No. 2, 1988

DONALD J. STOKES AND GRAHAM G. SULLIVAN

Auditors' Responsibilities for Events Arising After Balance Date

This paper critically evaluates relevant Australian and international professional documents applicable to the auditor's duties to audit and report on listed companies' annual accounts in the open-ended period subsequent to balance date. This examination suggests certain defects within these documents of potentially serious legal consequence. Particular attention is focused on matters relating to the tenure of the statutory audit appointment, the derivative contractual arrangement and the notion of auditor reliance upon management. The extent to which compliance with professional documents, adopted throughout the profession, is a necessary and sufficient defence in lawsuits grounded in negligence claims is analysed. This analysis is sustained in terms of the legal standard of care that may be judicially applied in the determination of auditor liability in the open-ended post balance date period.

Key Words: Auditing standards; Auditors' responsibilities.

1. INTRODUCTION

The international accountancy profession recently re-examined matters relating to those events of accounting and auditing significance that may arise subsequent to balance date. This examination, which culminated in the issue of IAG21 in October 1985,[1] recognized that the composition of annual accounts, prepared as at balance date, but issued publicly and filed at various dates subsequent thereto, can be significantly affected by intervening events. IAG21 is an International Auditing Guideline issued by the International Federation of Accountants. Australia is a member of this Federation and in April 1986 the professional accountancy bodies in this country reissued AUP8. This revision substantially harmonized AUP8's

---

[1] Refer to References for a listing of the professional documents examined in this paper and extant as at 30 November 1987.

Donald Stokes is a Senior Lecturer, Department of Commerce, University of Queensland, and Graham Sullivan a Lecturer, School of Accounting, The University of New South Wales.

The authors gratefully acknowledge the helpful comments on predecessor drafts of this paper by Associate Professor G. Pound, Department of Accounting and Finance, Monash University, and former Technical Director—Auditing of the Australian Accounting Research Foundation; Mr G. Lehmann, Associate Director, Tax Technical Services, Price Waterhouse and Senior Lecturer, School of Accountancy, The University of New South Wales; and participants in seminars presented at The University of Sydney, Macquarie University and The University of New South Wales.

requirements on the auditor's responsibilities for events after balance date with this international guideline.

This paper examines the professional and legal obligations imposed on auditors concerning the discharge of their duties to audit and report on a listed company's annual accounts in the open-ended period subsequent to balance date. We argue that aspects of AUP8 and IAG21 are inconsistent with relevant statutory and contract law and associated judicial determinations.

Section 2 of the paper outlines the basic temporal framework as reflected in the Australian statutory and institutional requirements. This framework applies equally to both AUP8 and IAG21. The following three sections analyse the professional and legal responsibilities of auditors (and directors) in terms of this temporal framework. They isolate for specific consideration the nature of the audit contract in the post-balance date period; the legal standard of care applicable to the adoption of professional documents; the legal indicia determining the tenure of the statutory audit appointment; the notion of auditor reliance upon management; and audit implications arising after the date of issue of the annual accounts. Concluding remarks are noted in the final section.

2. STATUTORY AND INSTITUTIONAL REQUIREMENTS

The periods from balance date to subsequent reporting and filing dates, as defined by the Australian Companies Act 1981 (Act), are non-trivial lengths of time when compared with the statutory definition of the *financial year* in sub-s. 5(1) of the Act. The period of the financial year is specified as twelve months, unless the directors resolve it to be either a shorter period (unconstrained) or a longer period not exceeding eighteen months. We assume in this paper a financial year of twelve months' duration.

Certain simplifying assumptions will now be made in order to provide a structured, temporal framework within which our analysis of AUP8 and IAG21 can be conducted. In practice, reporting sequences other than that developed in this paper may prevail, but nothing turns on such preferences so far as the analytic content of this paper is concerned.

The basic assumption is that a listed company prepares its annual report with the objective of meeting its statutory and institutional reporting deadlines on the ultimate permitted dates. On this assumption the following sequence of events occurs:

1. The most extended date for formal requirements arising under the Act is defined in sub-s. 263(1) (a). This is the last day on which a company may lodge its annual return with the National Companies and Securities Commission (NCSC) and this day must be no later than one month from the date of the annual general meeting (AGM). Sub-section 240(1) requires the AGM to be held at least once in every calendar year and within five months of balance date (To). Therefore the NCSC filing date cannot be later than six months from balance date. Accordingly in terms of our basic assumption the AGM must be held on a day five months from balance date (T5), with the NCSC filing date being on a day six months from balance date (T6).
2. Sub-section 274(1) requires a company's annual accounts, reports and statements,

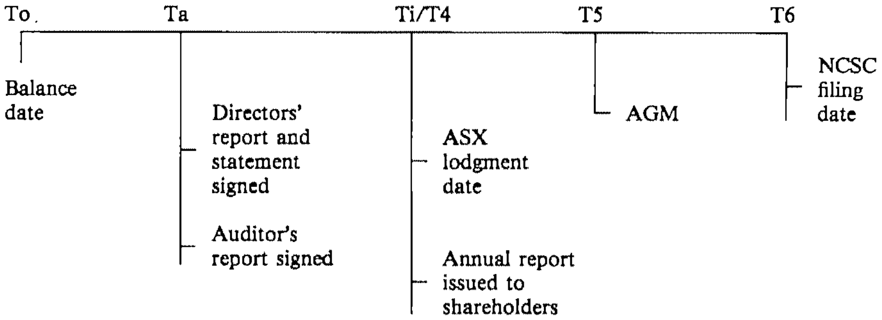
as demanded variously by ss 269, 270 and 285, to be issued to shareholders at a date not later than fourteen days before the AGM. However, for listed companies, sub-s. 3C(1) of the Main Board Official Listing Rules of the Australian Stock Exchange Limited (ASX) requires that this issue date to shareholders (Ti) and lodgment date with the Home Exchange be on a day not later than four months (T4) from balance date. In terms of our basic assumption both the issue and lodgment dates occur contemporaneously at T4, that is, Ti and T4 coalesce.

3. This date of issue of the annual report documents defines in AUP8 and IAG21 two distinct periods being: (a) the closed period from the date of the auditor's report (Ta) to the date of issue of the annual report (Ti/T4); and (b) the open-ended period subsequent to Ti/T4. The significance of this distinction is examined in Section 4 of this paper.
4. Sub-section 285(2) requires the auditor to furnish the audit report to the directors in sufficient time to enable the company to comply with sub-s. 274(1). The date of the auditor's report cannot precede the dates on the report and statement signed by the directors, but it may succeed, or be contemporaneous with, those dates.[2] We assume contemporaneous dating of these three documents at Ta. Further, Ta may occur at, or before, Ti/T4. But in order to reflect the structure of AUP8 and IAG21, we must assume that Ta occurs at some (undefined) date prior to Ti/T4.

The temporal scale, or continuum of reporting and filing dates, consistent with the statutory and institutional requirements just noted, reflecting the temporal framework of AUP8 and IAG21, and in accord with our basic assumption, is depicted in Figure 1. The scalar interval is defined as one month. The set of assumptions underlying the structure of Figure 1 is the necessary and sufficient set that permits precise analysis of the legal and auditing implications arising differentially within the temporal demarcations noticed in AUP8 and IAG21.

Figure 1

DEFINED CONTINUUM OF DATES



---

[2] Radford (1981, p. 42) suggests that these dates should be contemporaneous so as to eliminate the period for which the auditor's legal liability exceeds that of the directors. However we argue in this paper, and cite authorities in support thereof, that the legal liability for both directors and auditors extends well beyond these dates.

An examination of PART VI of the Act reveals that statements of *opinion* are demanded of auditors and directors at Ta. Indeed, such opinions cover three distinct temporal periods which the Act itself structures as follows:

1. Sections 269, 270 and 285 detail the obligations to be discharged by directors and auditors concerning the presentation of true and fair annual accounts for the year ending at To.
2. Sub-sections 269(11) and (12) require the directors to pay regard to any matter arising in the period To-Ta, when such a matter prejudices the representations constituting the truth and fairness of the annual accounts prepared as at To. The auditor's report prepared under sub-s. 285(1), noticing sub-s. 285(3) (a) (i) and (ii) and (e) and adopting the s. 266 interpretation of the term *accounts*, moves the auditor into the specific ambit of sub-ss 269(11) and (12) if the directors fail to comply with the clear directions within these latter sub-sections. Thus events from To-Ta are the concern of both auditors and directors.
3. Sub-sections 270(1) (d) and (e) and 270(2) (d) and (e) require the directors to give particulars of any matter or circumstance arising subsequent to To that has affected, or may affect, the operations, results and state of affairs of the company and group in succeeding financial years. The auditor is implicitly enjoined in a similar duty under sub-s. 285(10).[3] The future orientation of these sub-sections implies a set of open-ended representations by the directors and the auditor that become continuing representations down to those points in time recognized under applicable Statutes of Limitation. Consequences arising from this observation are examined in Section 5 of this paper. Thus events from To and into the open-ended period beyond Ta are also the concern of both auditors and directors.

This preliminary analysis demonstrates that the Act deals with the reporting responsibilities of both auditors and directors under three discrete, temporal dimensions, being the financial year ending at To, the closed period To-Ta, and the open-ended period after Ta. This statutory temporal structure is also paralleled in AUP 8 and IAG 21 with the exception that these documents, as previously mentioned, impose a further event, the date of issue of the annual accounts, at Ti/T4.

3. THE SUBSEQUENT EVENTS PERIOD: To-Ta

In Australia, AAS8 and ASRB1002 prescribe the reporting disclosures to be accorded by directors to an 'event occurring after balance date' (AAS8 para. 3(c))[4] but prior to the 'time of completion' (AAS8 para. 3(d)). AAS8 para. 3(c) effectively defines this subsequent events period for directors as extending from To to the time of completion of the financial statements. This 'time of completion' is defined in para. 3(d) (i) as the date of the directors' statement (Ta). AUP8 para. 2 restates these definitions. However, AUP8 para. 6[5] effectively defines the subsequent events period for auditors as extending to the date of the auditor's report (Ta), stressing that this date should not be earlier than the directors' time of completion date. Our analysis of these four professional documents (AAS8-ASRB1002, AUP8-IAG21), insofar as they deal with the period To-Ta, raises the following three observations.

---

[3] See generally Stokes (1982).

[4] Reference is made only to AAS8 provisions as there is no material difference in the equivalent paragraphs of ASRB 1002.

[5] Reference is made only to AUP8 provisions as there is no material difference in the equivalent paragraphs of IAG21.

First, in terms of AUP8 para. 6, the audit examination proceeds to, and ceases on, the date the auditor's report is signed. The date of the directors' time of completion may coincide with, or precede this date, but can never succeed it. Thus AUP8 recognizes that the auditor's responsibility is to report on the annual accounts as presented by the directors and that such accounts are not recognized in law until the approval procedures stipulated by the Act have been fulfilled by the directors. It follows that, legally, the audit report date can never precede the directors' time of completion date.

It seems to be an objective of both AUP8 and IAG21 to coincide the date of cessation of the active audit duty with the dates of signing the auditor's report and the directors' statement and report, but without demanding such coincidence of dates as a matter of necessity. As a result, two partially overlapping, but distinct, subsequent events periods emerge: one for directors and a slightly more extended one for auditors.

Second, AUP8 para. 11 states that the ambit of the *active* audit obligation is bounded at Ta, the date of the auditor's report. However, as discussed in Section 4, AUP8 and IAG21 extend the *reactive* audit duty beyond Ta in certain defined circumstances. We further argue, also in our Section 4 analysis dealing with the tenure of the audit appointment, that the *active* audit obligation extends to T5.

Third, in the general circumstance, AUP8 para. 8 requires the auditor to perform only the set of limited audit procedures, as detailed in paras 9 and 10, from To-Ta. Neither AAS8 nor ASRB1002 comments on the nature of the directors' accounting responsibilities during this same period except to require the reporting disclosure that an event occurring after balance date be 'brought to account' or reported by 'way of note' (AAS8 paras 16, 17 and 18). Certainly no lesser set of accounting procedures, compared to those in operation down to To, is suggested.

Neither does the Act prescribe the nature of the accounting and auditing processes required of directors and auditors respectively before, or after, To. Such determinations have been left to the profession, influenced by judicial decisions. It is also clear that the Act does not distinguish a greater or lesser onus of responsibility on directors, as compared to auditors, from To-Ta.

Thus AUP8, in contradistinction to the other documents and the Act, stands apart in presuming to distinguish a change in the nature of the audit (not the accounting) process from To-Ta. This document, in specifying the set of limited audit procedures that may be applied from To-Ta, departs from the prescription of substantive and comprehensive audit procedures normally applied in respect of the annual accounts down to To. The nature of the audit process changes as from To. There is a reduced audit scope. Thus for the auditor's responsibilities the profession, in AUP8 and IAG21, articulates that which statute (and AAS8 and ASRB1002 analogously) does not.

A potential problem arises where this limited audit approach, applied between To-Ta, fails to detect a material item which adversely affects the truth and fairness of the annual accounts, but which could probably have been detected under an unlimited audit approach. The courts could then be asked to determine whether there has been a breach of audit contract, or the proper discharge of audit duty under statute and/or common law to defeat a suit framed in the tort of negligence.

The contrary view is that the profession agrees in its documents that the audit process from To-Ta is designed only to identify and disclose both material changes in balance date representations and other material items that have arisen since To. The changed and limited audit objective then reasonably attracts changed and limited audit procedures. But it remains to be tested whether the courts will accept this diminution of the audit objective and the associated audit procedures as being a legally valid standard of care.

The Legal Standard of Care

In *Lanphier* v. *Phipos* (1838) 8 C&P 475, Tindal CJ stated at 479 that: 'Every person who enters into a learned profession undertakes to bring to the exercise of it a reasonable degree of care and skill'. But the legal indicia constituting the achievement of reasonable care and skill in the discharge of professional responsibility in a particular circumstance attract some measure of uncertainty.

In determining the fact of negligence it is necessary, at least, to define the requisite standard of care from the viewpoint of the 'reasonable man'. Lord Porter offers a judicial view in *Potts or Riddell* v. *Reid* [1943] AC 1 at 31: 'negligence is the failure to use the requisite amount of care required by the law in the case where a duty to use care exists. At common law the degree required is that expected of the "reasonable man".'

The concept of the 'reasonable man' applicable in negligence actions against members of a learned profession (e.g., auditors) has been enunciated by McNair J in *Bolam* v. *Friern Hospital Management Committee* [1957] 1 WLR 582 at 586:

> But where you get a situation which involves the use of some special skill or competence, then the test as to whether there has been negligence or not is not the test of the man on the top of a Clapham omnibus, because he has not got this special skill. The test is the standard of the ordinary skilled man exercising and professing to have that special skill.[6]

In determining whether a legally acceptable standard of care has been met in a specific circumstance, Fleming (1983, p. 113) states that considerable evidentiary weight would arguably attach to whether or not a defendant's conduct conformed to standard practices accepted as normal and general by other members of the profession in similar circumstances. This general rule is found in *Marshall* v. *Lindsey County Council* [1935] 1 KB 516 at 540, per Maugham LJ: 'An act cannot, in my opinion, be held to be due to a want of reasonable care if it is in accordance with the general practice of mankind'.[7]

Therefore conformity with general practice will, prima facie, usually suffice to satisfy the legal standard of care. Conversely, failure to adopt general practice is often the strongest possible indication of want of care because it suggests at once that the defendant did not do what fellow professionals would consider proper practice in similar circumstances. This ratiocination would seem to support an auditor's action in abiding by the restricted contents of AUP8 and IAG21 in the period To-Ta.

---

[6] Affirmed by Lord Edmund-Davies in *Whitehouse* v. *Jordan* (HL (E)) [1981] 1 WLR 246 at 258.

[7] Affirmed by MacKinnon LJ in *Mahon* v. *Osborne* [1939] 2 KB 14 at 43. See also *Paris* v. *Stepney Borough Council* [1951] AC 367 at 382, per Lord Normand; *Bolam* v. *Friern Hospital Management Committee* at 587, per McNair J; and *Cavanagh* v. *Ulster Weaving Co. Ltd* [1960] AC 145 at 158, per Viscount Simonds: but see also the caveat stated at 146 that 'evidence as to trade practice alone could not be treated as conclusive in favour of the defendants'.

However an important qualification to this general principle has been consistently advanced by the courts. As early as 1860, Chief Justice Cockburn in *Blenkiron* v. *The Great Central Gas Consumers Company* (1860) 2 F&F 437, distinguished that compliance with common practice is normally evidence that reasonable care has been taken, but that it is not necessarily conclusive since:

> It is not enough that they do what is usual if the course ordinarily pursued is imprudent and careless; for no one can claim to be excused for want of care because others are as careless as himself; on the other hand, in considering what is reasonable, it is important to consider what is usually done by persons acting in a similar business. (at 440)

This view was reinforced by Rich, Evatt and McTiernan JJ in *Mercer* v. *Commissioner for Road Transport and Tramways (N.S.W.)* (1936) 56 CLR 580 at 593: 'the general practice itself may not conform to the standard of care required of a reasonable prudent man. In such a case it is not a good defence that the defendant acted in accordance with the general practice.'

Hence a neglect of duty does not cease to be such merely because of its repetition time and time again. This so-called doctrine of 'lulling to sleep' has also been repudiated by Moffitt J in *Pacific Acceptance Corporation* v. *Forsyth and Others*, (1970) 92 WN (N.S.W.) at 75: 'if the auditing profession or most of them fail to adopt some step which despite their practice was reasonably required of them, such failure does not cease to be a breach of duty because all or most of them did the same'.[8]

This analysis supports the conclusion that the profession is not denied its prerogative to set its own regulatory code, but if adherence to this code does not produce true and fair annual accounts, then the courts have put the profession on notice that such conformity will not deter heavy penalties. Thus, there is a risk for auditors if they rely on the limited audit procedures applied between To-Ta as being those of the profession at large. If a court found this prescription of AUP8 and IAG21 defective in law, it could well fall back on the notion, grounded in the cases cited above, that the entire profession had been insufficiently diligent. Therefore, in the final analysis, the standard of reasonable care is measured by what ought ordinarily to be done rather than what is ordinarily done. Were it otherwise, an entire profession would be free, by maintaining careless methods, to set its own uncontrolled standards with no incentive to devise new and more appropriate standards.

4. THE SUBSEQUENT EVENTS PERIOD: Ta-T5

Our analysis of the period Ta-T5 (comprising the sub-periods Ta-Ti/T4 and Ti/T4-T5) concentrates on two issues which question the assumptions underlying the responsibilities assigned therein to auditors and directors. In Section 5 we deal with further matters specific to the sub-period Ti/T4-T5+.

---

[8] See also *Bank of Montreal* v. *Dominion Gresham Guarantee and Casualty Co.* [1930] AC 659 at 666, per Lord Tomlin; and *Carpenters Co.* v. *British Mutual Banking Co.* [1937] 3 All ER 811 at 820, per Slesser LJ.

First, what period of time measures the limits of the statutory audit appointment? By way of corollary thereto, what period of time measures the limits of the audit contract? Second, can auditors discharge the onus of office by mere passive reliance upon management's initiative to bring forward those matters which management decides are in need of redress? As corollary thereto, can the audit process be placed in a passive mode after Ta, to be re-stimulated into an active mode either by the auditor's identification of some fact materially disaffecting the annual accounts or by the aforementioned reliance upon management?

The Tenure of the Audit Appointment

The intention of sub-ss 280(3) and (4) of the Act is that the statutory audit appointment at any AGM offers the expectation of permanence of tenure, contradicted only by death, or the removal or resignation from office provisions of sub-ss 282(1) and (6) respectively, and the disqualifying conditions of sub-ss 277(1) and (2). The period of the audit contract generally runs from AGM to AGM. What emerges is that statute allows continuity in office, while contract, depending on the terms therein, generally provides for appointment in office until the next AGM at least.

Three legal relationships thus arise. The appointment is both *statutory* and *contractual* as between the incumbent in office and the company. The third relationship is that which is enforceable by third parties, noticed in law and pleading loss under some branch of *tort*, the common tort complained of being that of negligence.

In stipulating the duration of the audit appointment, sub-s. 280(4) uses the expression 'holds office', which is not statutorily defined. However, the obligations of holding this office are to provide the audit report demanded by sub-s. 285(1), to state in this report the matters demanded by sub-s. 285(3) and to form the opinion demanded by sub-s. 285(4). These are the bare duties; statute does not directly require an audit. This connection has, however, been judicially made; the duty to conduct an audit is subsumed within the duty to form the opinion expressed in the audit report.

Moffitt J, in the *Pacific Acceptance Corporation* case, posed this question at 45:

> Questions first arise as to whether an auditor . . . has a duty merely to make a report as prescribed by the Act . . . or whether there is a separate promise to audit as well . . .

The question was clearly answered at 51:

> By their appointment they become the auditors . . . for a specific period and by accepting the appointment they undertake to audit the company's financial affairs for the specific period, 'audit' being in the sense well understood by their profession, and businessmen.

And, also at 51:

> In any event the duty to report . . . supports that there is a duty to audit for the very nature of the statutory duty to report presupposes that on appointment *during the term of office* there will be performed duties of an auditing nature. (emphasis added)

And further, at 52:

> Upon his appointment . . . to ***hold office until the next annual general meeting,*** he must be taken to have directly promised at least to do such an audit . . . as will be appropriate to form the opinion already referred to . . .[9] (emphasis added)

Proceeding from these observations it appears that statutory and contractual responsibilities require an audit and that such must be done throughout the term of office. The term of office normally proceeds from the initial statutory appointment and is given effect by the formal writings constituting the contractual arrangement which, to acknowledge statutory intent, must proceed to the next, or succeeding, AGMs. The holding of office means that such holding bespeaks a duty, a duty to perform an audit.

It is difficult to concede in law that there can be some period defined as Ta-T5, or some sub-period therein, where the responsibilities of holding office can be casually laid aside. Doing nothing, as contemplated by AUP8 paras 11 and 16, cannot constitute an audit. This observation is discussed more fully in the following subsection and in our Section 5. Further, it is difficult to concede in law that there can be a period defined as To-Ta where the responsibilities of holding office can be fulfilled by a set of limited audit procedures, as specified in AUP8 paras 7-10.

Reliance Upon Management

Auditor reliance upon management permeates the period Ta-Ti/T4 as it does the period To-Ta. Both AUP8 and IAG21 advocate certain matters which are reducible to at least the following two propositions, from which legal consequences may be drawn:

1. The auditor has no responsibility to conduct an active audit in the period Ta-Ti/T4. AUP8 para. 11 is plain that: 'The auditor does not have any responsibility to perform audit procedures to identify events occurring after the date of the auditor's report'. Furthermore, AUP8 para. 16 reinforces this proposition in respect of the open-ended period Ti/T4 + : 'After the financial statements have been issued, the auditor has no obligation to make any continuing inquiry with respect to such financial statements'. We have argued above that from To-T5 the auditor is under undiminished statutory and contractual obligations to audit down to T5.
2. The responsibility for identifying matters of audit significance passes to management in the period Ta-Ti/T4. AUP8 para. 11 states that:

   > During the period from the date of the auditor's report to the date the financial statements are issued, management has the responsibility for informing the auditor of any events which may affect the financial statements.

   Under AUP8, and in terms of the common law fiduciary obligations of directors to their company, management is obliged to discharge, in the period Ta-Ti/T4, a responsibility which the auditor is entitled to relinquish. This reliance extends to dependence on management to initiate the bringing forward of matters which management's judgment decides are in need of redress (para. 11), unless such matters come fortuitously to the auditor's attention (para. 12). It is only when the auditor becomes aware of audit significant events through either of these processes that *reactive* audit duties arise in terms of AUP8 paras 12-15.

---

[9] See also *Frankston & Hastings Corporation* v. *Cohen* (1960) 102 CLR 607; and *Re Thomas Gerrard & Son Ltd.* (1968) 1 Ch 445 at 475.

Thus audit initiative passes from the auditor to management, whereby the presumption of breach of auditor independence is difficult to deny. Down to T5, statutory and contractual obligations compel full audit performance in office. This vesting of audit initiative in management does not appear to constitute a legal (or even commonsense) notion of such performance in office.

Furthermore, management's responsibilities in this respect seem, according to the documents, to end at Ti/T4. AUP8 and IAG21 are silent on the matter in the open-ended period subsequent to Ti/T4, while AAS8 fails to address the issue, advising in para. 2 that: 'Events occurring after the time of completion are outside the scope of this Statement'.

Adherence to the documents would seem to ignore the directors' common law duty to observe the fiduciary relationship subsisting between them and the company, a duty which continues unabated after Ti/T4. The discharge of this fiduciary duty would necessarily require the directors to monitor continuously the company's financial condition and to inform the auditor (and shareholders) of any material fact affecting the truth and fairness of the annual accounts in the open-ended period subsequent to Ti/T4. Arguably, AAS8 could make this obligation plain. In law, the representations of the directors as at Ta are continuing representations in terms of, at least, sub-ss 270(1) (e) and 270(2) (e) of the Act. After-acquired information, which conflicts with such representations, may cause these representations to hold the legal character of misrepresentations, provided only that such is proved in law. If such representations remain uncorrected they may expose directors to liability under statute, contract and the torts of negligence and deceit, or to compensation claims if there is proven innocent misrepresentation.

What then, is the precise nature of this reliance upon management? What legal consequences, if any, arise if the auditor does vest such reliance upon management, and management fails to respond? We have examined this issue elsewhere (Stokes and Sullivan, 1985), and our conclusions are as follows.

It is a clear intention of both statute and the profession that the auditor be independent of management. The professional documents seem, in part, to be departing from this standard. We argue that to concede audit initiative to management, in the period Ta-Ti/T4 (and beyond to T5), denies the integrity of audit evidence, breaches auditor independence and exposes the auditor to potential liability under statutory, contractual and tortious suits.

It is the auditor alone who is responsible in law for the conduct of an audit. The auditor is bound to audit; doing nothing, and that is what reliance on AUP8 and IAG21 reduces to, cannot possibly constitute the doing of an audit. The authorities cited in our 1985 paper support this conclusion.

5. THE SUBSEQUENT EVENTS SUB-PERIOD: Ti/T4-T5+

AUP8 para. 17 states that:

> If after the financial statements have been issued, the auditor becomes aware of a *fact* that materially affects the financial statements previously reported upon and which existed but was not known to the

> auditor at the date of the auditor's report, the matter should be discussed with management. (emphasis added)

The import of paras 18-20 is simply to ensure that one of three audit responses is carried out consequent to the *fact* in para. 17 manifesting itself to the auditor. The significance of these provisions can be summarized as follows:

1. The period is open-ended, though obviously the degree of criticality will diminish over time as the annual accounts of succeeding years are produced, finally terminating at those points in time determined by applicable Statutes of Limitation.
2. No active audit duty is placed on the auditor over this open-ended period. The auditor need only respond to that fact, as defined in para. 17, which re-activates audit awareness, being under no duty so to place him/herself that he or she is likely to encounter such a fact. No legal difficulty seems to attach to this provision in so far as it relates to the open-ended post-T5 period, the only caveat being that the reactive audit philosophy of paras 17-20 must apply in respect of any material fact existing at any time at or before T5 but remaining unnoticed until after T5. Our analysis below treats this observation more closely in the context of continuing representations. After T5 the audit contract is ended, as is the statutory duty, so it is not possible to advance any argument that continuing active audit obligations obtain. They do not. Therefore the prescription found in paras 17-20 seems legally sound for the post-T5 period only.
3. The *fact* mentioned in para. 17 is not one which exists in the first instance after Ta; the fact must have existed at or before Ta, remaining unnoticed by the auditor until after Ti/T4. But within the sub-periods Ta-Ti/T4 and Ti/T4-T5, two further situations ignored by para. 17 and not dealt with elsewhere in AUP8 require attention. These situations are when: (a) a fact comes into existence during Ta-Ti/T4 but is not noticed until Ti/T4-T5, and (b) a fact comes into existence during Ti/T4-T5 and is noticed in this same period.

All three situations attract the same analysis and conclusion. We argue, in terms of our Section 4 analysis, that the exclusive and restrictive situation under para. 17 and the ignorance of situations 3a and 3b above are without legal validity. Any material fact affecting the truth and fairness of the annual accounts and coming into existence at any time down to T5 is the concern of the auditor. The representations contained in the audit report (and annual accounts and directors' report and statement) are continuing representations down to T5 (and beyond, depending on applicable Statutes of Limitation). This matter of the continuing nature of the legal representations in the audit report (and other documents) and the impact thereon of a material fact emerging during Ta-T5 and noticed at any time from Ti/T4+ raises an issue in law unrecognized in the professional documents.

For example, consider the situation of a listed Australian company with the following 1987 reporting dates: balance date (To) 31 May; signing date (Ta) 31 August; issue date (Ti/T4) 30 September; AGM date (T5) 31 October. Assume the market values of the company's investments in marketable securities were materially disaffected by the events of 'Black Tuesday' 20 October 1987, the day on which Australian (and world) share markets sustained severe losses.[10] This is an example of a fact arising between Ti/T4-T5 with potential to impact materially on the annual accounts drawn up as at To. It is difficult to accept that the company's annual accounts, reports and statement retain the legal character of that measure of truth and fairness at T5 that they presumably attained at Ta and Ti/T4. The fact that the results of this circumstance will be reported in the financial statements of the succeeding financial year, and that notification to the ASX will take effect immediately in compliance with the s. 3A(1) and (2) Notices provisions, does not fully resolve the issue. The matter requires reporting at the 1987 AGM,[11] yet the professional documents remain silent on this point, even though the law is quite settled.

Lord Hailsham of St Marylebone (1980, p. 3) is authority for the view that non-correction or inaction or silence may cast that which is not done into the fastness of negligence: 'Negligence is a specific tort and in any given circumstances is the failure to exercise that care which the circumstances demand . . . It may consist in omitting to do something which ought to be done.' Most recently in *Jones* v. *Dumbrell* [1981] VR 199, Smith J at 203-4, relying on *Robertson & Moffat* v. *Belson* [1905] VLR 555, reiterated that a representation, true when made, but which later circumstances falsify, must be corrected.[12] In Smith J's opinion (at 203) a representation once made, upon which inducements to rely and act are held out to other parties, becomes a continuing representation in reality and not merely by construction of law. Altered circumstances affecting the operation of the continuing representation demand rectification and notification to affected parties. Silence could bespeak misrepresentation and a tort in negligence could result.

The construction to be placed on this analysis is that the original audit representation (and directors' representations) at Ta becomes a continuing representation. A liability in the tort of negligence could then emerge if the auditor gains knowledge of new information existing prior to T5 which renders this representation misleading and knowingly sustains the then misrepresentation by his or her silence.

6. CONCLUDING REMARKS

This paper has examined the legal and professional responsibilities laid on auditors (and directors) touching the proper discharge of their duties to audit and report on a listed company's annual accounts in the various sub-periods subsequent to balance date. The prescription of limited audit procedures, deemed adequate for the period To-Ta, appears to reflect an incorrect perception that this diminution in audit obligation is compatible with statutory, contractual and common law. We have argued that legal obligations require the doing of an audit throughout the full term of office, such term flowing discretely from AGM to AGM.

---

[10] Other disruptive factors could include major foreign currency losses, expropriation of assets in politically disturbed countries and losses owing to natural disasters. Such events could well destabilize a company to the prejudice of its going concern capacity.

[11] This issue has been mentioned in the business literature. See Walker (1987, p. 107).

[12] A declarative statement of this law is found in the dictum of Turner LJ in *Traill* v. *Baring* (1864) 4 De GJ & S 318 at 329. See also *With* v. *O'Flanagan* [1936] 1 Ch 575 at 584, per Lord Wright MR; and *Smith* v. *Kay* (1859) 7 HLC 750 at 768, per Lord Cranworth.

For the period Ta-Ti/T4, AUP8 and IAG21 transform the audit attitude from an active to a reactive (or passive) mode, and enforce an obligation on management to take up a quasi-audit function which the auditors may have incorrectly and prematurely relinquished. This development is antipathetical to the keystone standard of auditor independence and is inconsistent with the clearly received judicial pronouncements noted. The documents fail to address adequately the auditor's responsibilities in the period Ti/T4-T5 +, particularly when a significant audit matter emerges for the first time after Ta.

These identified differences, supported by the analysis within this paper, may prompt the profession to re-examine its existing requirements, in full awareness that the prerogative to advance professional standards cannot long subsist in isolation from those principles of law that overlay this process. On this fundamental point, the courts are plain.

REFERENCES

Accounting Standards Review Board, *ASRB1002: Approved Accounting Standard: Events Occurring After Balance Date*, Sydney 1985.

Fleming, J. G., *The Law of Torts* (6th edn), Law Book, 1983.

Institute of Chartered Accountants in Australia, 'AAS8: Statement of Accounting Standards: Events Occurring After Balance Date', *Members' Handbook*, ICAA, 1987.

———, 'AUP8: Statement of Auditing Practice: Audit Implications of Events Occurring After Balance Date', *Members' Handbook*, ICAA, 1987.

International Auditing Practices Committee, International Federation of Accountants, *IAG21: International Auditing Guideline: Date of the Auditor's Report; Events After the Balance Sheet Date; Discovery of Facts After the Financial Statements Have Been Issued*, IAPC, 1985.

Lord Hailsham of St Marylebone, *Halsbury's Laws of England* (4th edn), Vol. 34, Butterworths, 1980.

Radford, R., 'The Audit Implications of SSAPs 17 and 18', *Accountancy*, January 1981.

Stokes, D. J., 'An A Priori Case for Verifying Disclosures in Directors' Reports', *Australian Business Law Review*, February 1982.

Stokes, D. J., and G. G. Sullivan, 'Auditor Reliance upon Management—A Legal Perspective', *Company and Securities Law Journal*, November 1985.

Walker, R. G., 'Brought to Account', *Australian Business*, 2 December 1987.

ABACUS, Vol. 24, No. 2, 1988

RANDALL B. HAYES AND WILLIAM R. CRON

Changes in Task Uncertainty Induced by Zero-Base Budgeting: Using the Thompson and Hirst Models to Predict Dysfunctional Behaviour

Generic budgeting systems such as PPBS and Zero-Based Budgeting (ZBB) are criticized by academics for failing to give consideration to some of the key variables affecting behaviour in budgeting endeavours. Despite this criticism, the literature has devoted little attention to modifications that can be made to make the systems more responsive to different configurations of organizational variables. This paper addresses this oversight in regard to ZBB. In particular the paper discusses ZBB within the context of two variables: (a) the degree of task uncertainty engendered by the system and (b) the character of performance measures used to evaluate units that employ ZBB. The paper argues that ZBB materially increases the degree of task uncertainty. Configured with the type of performance measures used to evaluate departments employing ZBB, the paper maintains that the increase in task uncertainty creates incentives to engage in dysfunctional behaviour, largely in the form of invalid data reporting. It is hypothesized that this problem may be responsible for the general failure of ZBB to lead to large budget re-allocations.

Key words: Budgeting; Behaviour, Performance Evaluation.

Zero-Based Budgeting (ZBB) is intended to reorient the budgeting process. Traditional budgeting methods tend to focus on increments to the budget allocations of existing activities. This focus serves to perpetuate, without review, both the manner and level at which existing activities are performed. The appropriateness of continuing with existing activities is not directly addressed. ZBB is designed to overcome this problem by forcing a critical review of all activities before funding decisions are made.

Currently, a variety of companies, not-for-profit organizations, and governmental units have adopted some form of ZBB. Experience has revealed that the budgeting process has several limitations. In particular, ZBB is not well suited for application in line departments, since its implementation requires a large investment of both time and effort, and the technique generates a cumbersome volume of paperwork which leads to significant administrative costs (see Gordon, Haka and Schick, 1984). Despite these problems, surveys indicate that adopting entities are generally pleased with the results (Stonich, 1977, Chap. 2; Austin, 1977, Chap. 1; Taylor, 1977; Cowen and

---

RANDALL B. HAYES is Associate Professor, School of Business Administration, College of William and Mary, Williamsburg, Virginia, and WILLIAM R. CRON is Professor, School of Business, Central Michigan University, Michigan.

Dean, 1979; Austin and Cheek, 1979, Chap. 1; Ameiss, 1982). These surveys reveal that the benefits of ZBB are generally not realized in major changes in total budget levels (see Hebert, 1977). Instead, the most often cited benefit is the way ZBB improves management's knowledge of the organization. Several authors (Austin, 1977; Sherlekar and Dean, 1980) cite instances where this has led to the diminishment of organizational rigidities induced by traditional budgeting systems (Williams, 1981).

These surveys of adopting entities and discussions of the merits and shortcomings of ZBB are useful, since they help test the overall effectiveness of an aggressively marketed product. These studies, however, focus only upon aggregate effects. The literature currently lacks a formal study of the managerial behaviour induced by the unique procedures of ZBB. Studies of managerial behaviour in the context of traditional budgeting systems have been accomplished in Hofstede (1967), Hopwood (1972), and Otley (1978). Using in-depth case analysis, these studies focus on the reaction to budgeting systems at the individual or micro level. The common aim of these studies is to investigate individual responses to budgeting frameworks that are essentially idiosyncratic in nature and hence may not be detectable using the aggregation procedures of survey techniques. Despite the idiosyncratic nature of the responses, evidence of their existence has helped researchers develop theories regarding the key variables governing behaviour in budgeting environments. Hopwood and Otley, for example, examine the relationship between behaviour and the degree of reliance on accounting performance measures, whilst Becker and Green (1970) and Stedry (1970) discuss the interaction of participation in the budgeting process, leadership style, and performance communication, and analyse how they jointly govern behaviour in budgeting situations. Considered as a whole, these studies represent an attempt to specify how given configurations of organizational variables may effect budgeting behaviour in different ways.

This paper seeks to initiate and encourage the study of budgeting behaviour under ZBB. The ultimate aim is to improve ZBB applications by making the design and implementation of its mechanics more responsive to some of the variables that affect behaviour in budgeting situations. The analysis is concerned with the configuration in typical ZBB settings of two variables affecting behaviour: the nature of performance measures and the degree of task uncertainty. As an extension of Thompson's (1967) analysis, Hirst (1981, 1983) models the interaction of these variables. Hirst's model posits that incentives to engage in dysfunctional behaviour are minimized when the type of performance measures selected for use in managerial evaluation are made contingent upon the degree of task uncertainty faced by the manager. Specifically, the model predicts that incentives to engage in dysfunctional behaviour are minimized when managers of units possessing a low degree of task uncertainty are evaluated using internal accounting measures. For units possessing high degrees of task uncertainty, incentives to engage in dysfunctional behaviour are minimized when environmental or interdependency measures are employed in manager evaluation. Hirst's model predicts that failure to tailor the type of performance measure to the degree of task uncertainty in this manner will increase motivations of managers to work or report in ways contrary to the aims of the organization.

Using the Hirst and Thompson models as a framework, this paper observes that ZBB is normally employed in units which, under traditional budgeting systems, often possess a low to moderate degree of task uncertainty. The paper also notes that a mixture of interdependency and internal accounting measures is traditionally utilized in the performance evaluation of these units. The paper then argues that the imposition of ZBB increases the openness of the adopting department to external influences. The system design of ZBB requires an entity, separate from the department, the budget committee, to evaluate the ZBB packages submitted by the manager. This encompassing outside review of the tasks of the department, which is not present in traditional budgeting systems, increases the openness of the department to external events and decisions. The paper argues that the increased openness in turn leads to an increase in the level of task uncertainty faced by the manager. One of the major determinants of the performance of the department, the budget allocation, is thus removed from the manager's control. The allocation is in the hands of an outside entity and its decisions are unpredictable from the manager's point of view. While Thompson and Hirst suggest this increase in task uncertainty should be accompanied by a change in performance metrics to avoid dysfunctional behaviour, available evidence suggests that adopting entities have not done this. Moreover, the paper argues that even if the alterations suggested by Thompson and Hirst were made in practice, they alone would not be sufficient to offset the particular type of increased uncertainty induced by the system. Because of the lack of any specifically designed remedies, the paper predicts that it is the increase in task uncertainty that is at least partially responsible for the widespread dysfunctional behaviour observed in ZBB applications.

The paper begins with a very brief discussion of ZBB procedures. The emphasis in this section is on the large degree of autonomy granted to the manager and on the processes which remove the manager from the budget decision. This section also outlines the areas in which ZBB is traditionally employed and briefly summarizes the large amount of anecdotal evidence regarding dysfunctional behaviour in ZBB applications. The second section discusses the Hirst model in more detail. Particular reference is made to the relationship between the design of performance measures and the level of task uncertainty, how ZBB changes the level of task uncertainty, and concludes by arguing that the steps suggested by Hirst and Thompson may be insufficient to eliminate incentives to engage in dysfunctional behaviour. The final section suggests some alterations that can be made to both ZBB and performance evaluation procedures to further reduce incentives to employ dysfunctional reporting strategies.

ZBB PROCEDURES, APPLICATIONS, AND DIFFICULTIES

ZBB Mechanics

As in most participatory budgeting systems, departmental managers operating in a ZBB framework recommend certain funding levels to a budget review committee. The review committee then considers the recommendations in determining the final budget allocations for the departments. Under ZBB the manner in which the budget recommendations are made is different. Unlike traditional systems, managers are required to relate the funding their departments receive to the separable activities their departments perform. In addition, they are required to show how each activity will be carried out and what the activity will accomplish at a number of different funding levels. In performing this task, however, managers are free to define their activities in any manner they choose. Moreover, they are free to form their own measures of activity performance. In this sense, ZBB represents a more decentralized form of budgeting; more discretion is given to managers in defining the activities of their departments and in devising measures of departmental performance.

The ZBB process begins with a review of the activities of each department. The manager is asked to isolate the department's separable activities and identify the levels at which each activity can be performed. A 'decision package' is then prepared by the manager for each feasible level at which the individual activities can be conducted. Each decision package specifies the output performance and associated costs that may be expected at the given activity level. After the activities have been defined, the feasible activity levels identified, and the cost/benefit forecasts associated with each level established, the manager ordinally ranks the packages. The basis for this ranking is left to the manager's discretion. The subsequent review process may take place at several levels in the organization. Typically, the budget review committee is composed of division managers and a representative of the controller's office. Usually the committee must make its selection in the presence of an overall budget constraint. In theory, the packages provide the information required to allow the necessary trade-offs to be accomplished in a rational manner.

Several variants of the above process exist in practice. Watkins (1978) and Rubinyi (1980), for example, describe procedures that allow a reduction in both the number of activities and the range of activity levels to be considered. Taylor (1977) along with Fogarty and Turnbull (1977) outline a technique that requires only intermittent large-scale application of the process. Other variants are described in Wholey (1978, Chaps 5-6). Essentially, the aim of these procedures is to reduce the administrative workload required by ZBB. These procedures do not, however, change the central features of the process, that is, the division of departmental functions into separable activities and the formulation of packages describing multiple activity levels.

Applications of ZBB

Researchers examining the employment of ZBB note that the technique is most suited for staff activities (McGinnis, 1976; Stonich, 1977; Suver and Brown, 1977; Cowen, 1979; Dean and Cowen, 1979; Dillon, 1979; Cowen and Shovlin, 1982). Although these studies concentrate on private-sector applications, the generalization appears valid for governmental and military organizations as well (Cleaveland, 1977; Wholey, 1978; Letzkus, 1978; Cowen and Dean, 1979; Hill and Sharp, 1983).

The generic classification of 'staff activity' actually subsumes several different types of functions. One organization theorist (Moore, 1964, pp. 439-43) identifies three different kinds of staff units: advisory, service, and functional control staffs. *Advisory staffs* (e.g., legal, market research, public relations and industrial engineering departments) exist to give counsel and provide expertise to selected line departments or to top management. The output of advisory staff units is thus consumed by particular units within the organization. *Service staffs* (e.g., maintenance, personnel, purchasing, security, and insurance) accomplish particular tasks for the organization as a whole. These units produce goods or services for common consumption. *Functional control staffs* (e.g., accounting, auditing, and finance departments) are charged with the maintenance of reporting and control processes within the organization. As these units are oriented toward the maintenance of systems that interconnect and coordinate the separate units of organization, the service they provide is also for common consumption.

Close examination of articles describing ZBB applications reveals that ZBB is not frequently employed in advisory staff departments. Application to service and functional control staff units is the common practice (Phyrr, 1977; Austin and Cheek, 1979; Cowen, 1979). Because the cost structures of service and functional control staff units are characterized by a preponderance of fixed or semi-fixed costs, standard costing and flexible budget systems are not well suited. It is this characteristic that makes these units logical candidates for ZBB.

ZBB Difficulties

Such applications of ZBB, however, have not been without problems. The most common difficulties are the unwieldy amount of paperwork the process requires and the use of dysfunctional reporting strategies by managers. The latter takes on a variety of forms, but they all have a common purpose: to influence the package selection process of budget review committees. Collectively, the dysfunctional strategies appear to be effective. They are often cited in case studies as the major reason why the employment of ZBB did not lead to noteworthy changes in budget levels. The dysfunctional strategies allowed managers to influence the package selection process and hence perpetuate existing budget allocations.

Perhaps the most common dysfunctional reporting strategies observed are variations of what Birnberg, Turopolec and Young (1982) call 'focusing activities', that is, the practice of highlighting certain elements of the information set and obscuring others. This takes two forms. First, managers may fail to forward to the budget committee certain viable packages. Second, managers may establish the ordinal rankings of the packages more in conformity with their personal preferences than with the ranking criteria set by the organization. Particular instances of these behaviours are noted in Burton and Cowen (1979), Minmier and Hermanson (1977), Cleaveland (1977), Cowen (1979), and Herzlinger (1979).

Forms of biasing (i.e., attempts to select from a range of messages the most favourable) are cited in Singleton, Smith, and Cleaveland (1977) and Austin and Cheek (1979). This involves misstating the projected results of the respective packages so that the packages preferred by the manager appear to have the best cost/benefit forecasts. 'Filtering activities' (i.e., manipulating the message with the aim of communicating effectively only favourable information) are reported by Herzlinger in her study of ZBB applications within the U.S. federal government. These practices involve making less-preferred packages overly complex or intentionally vague. Sherlekar and Dean (1980) note similar behaviour in private-sector applications. In addition, several papers observe numerous instances of over-aggregation: the practice of combining separable activities into a single project. Singleton, Smith and Cleaveland (1977), Cowen and Dean (1979), and Herzlinger (1979) refer to this problem in situations where the department has tasks which are ancillary to its main activities.

Regardless of its specific form, the above-mentioned authors suggest dysfunctional behaviour is a serious problem in the use of ZBB. This is a problem common to participatory budgeting systems. As Becker and Green (1970, p. 375) point out, budgets produced by participatory systems are products not only of the budgeting techniques employed but also of the personal motivations of the participants. But the problem appears uncommonly severe in ZBB. Why does ZBB provoke so much dysfunctional behaviour? An analysis of ZBB in the context of the Hirst and Thompson models can supply part of the answer.

PERFORMANCE EVALUATION MEASURES AND TASK UNCERTAINTY: HOW THEY COMBINE TO PROVIDE MOTIVATIONS TO ENGAGE IN DYSFUNCTIONAL BEHAVIOUR

The Hirst Model

Hirst associates motivations to engage in dysfunctional behavior with the design of performance measures and the level of task uncertainty. Central to the model is the dichotomy between *open units* and *insulated units*. An open unit is defined as one whose operations are subject to influence from forces or events external to the unit. An insulated unit is one whose operations are buffered or unaffected by external events. In open units, factors largely beyond the manager's control govern what is ultimately accomplished by the department. In this situation, the manager faces a high degree of task uncertainty: the cause – effect relationship between what the manager does and what is achieved is not well defined. Hirst argues that two types of performance measures, *environmental* and *interdependency*, are most appropriate for these units. Environmental measures attempt to express how well the manager coped with the demands of his environment. The source of the information for the measures is in part located outside the organization. A market share statistic is an example of an environmental measure for a sales department. This metric expresses how well the department performed in comparison with other sales departments given existing ('outside') market conditions. Interdependency measures attempt to express how well the department fulfilled the demands placed upon it by other units and are appropriate for departments which serve other units in the organization. The source of the information for the measures is located within the organization. Interdependency measures are normally obtained from the department's reference group, frequently as attestations from individuals who rely on the staff services provided by the department. An important aspect of interdependency measures is that they are designed to consider the demands made upon the staff unit by the unit's customer. In effect, the evaluator (the customer) is supposed to make the evaluation contingent upon the nature and difficulty of his demands. In this sense, interdependency measures are similar to environmental measures, that is, both are designed to express how well the staff unit functioned given the circumstances of its environment.

A third type of performance metric, *internal accounting measures*, is argued to be inappropriate for use in the evaluation of open departments. These metrics provide incomplete measures of performance because they reflect only the results of internal processes and give no formal recognition to the environment faced by or the demands placed upon the manager by other units. Hirst argues that if internal accounting measures are used in the evaluation of the manager of an open department, tensions will increase in subordinate – superior relationships and the managers will seek relief by engaging in dysfunctional behaviour (1981, p. 777).

Internal accounting measures are appropriate for the evaluation of units which are relatively insulated from external forces. In these units, what the department accomplishes is under the direct control of the manager and he faces a relatively low level of task uncertainty. For example, a billing department of a municipality responsible for the mailing and of property tax assessments would be considered an insulated unit. The manager is responsible for handling the tax accounts of a relatively constant number of assessment units. Environmental conditions are stable and demands from other departments are predictable in nature. In this situation, internal accounting measures such as the cost per billing and billing error rate provide unambiguous measures of performance. The measures are complete; they capture 'the key outcomes associated with task performance' (1981, p. 776). The lack of ambiguity serves to diminish disagreements over performance evaluation and subordinate – superior tensions are thereby reduced. Although dysfunctional behaviour may still be engendered because of the highly structured nature of the tasks performed, the behaviour is not the result of incomplete performance metrics. Because the performance measures are complete, tensions are reduced from what they otherwise would be if more ambiguous performance measures were employed.

Interdependency measure may also be used in the evaluation of an insulated unit, particularly for the evaluation of any non-quantifiable outputs. In the example of the billing department, interdependency measures might be formulated to assess the level of services or the accuracy of any information provided to other departments. There is less of a need, however, for evaluators to make their assessments contingent upon the level of service demanded. For an insulated unit, these demands are stable and only the level of service itself needs to be considered.

Characterization of Units Using ZBB

As noted earlier, ZBB is typically employed in service and functional control staff units. Within the context of the Hirst model, these units possess many of the characteristics of insulated units. The task environments of these units are both comparatively *stable* and *homogeneous* (see Thompson, 1967, pp. 69-72). In part, stability is a function of the permanency of the location of the major clients of the unit. For service and functional control staffs, the clients are the other units (both line and staff) of the organization. Location in this sense refers not only to the clients' physical placement but also to the clients' respective positions within the organizational design of the entity's hierarchy. These locations usually evolve slowly. Major changes rarely occur but when they do, as in company-wide reorganizations, the changes are formally documented and new interrelationships well specified. Little uncertainty exists, therefore, in the determination of the location of the unit's clients. Distribution channels, that is, how and where to send the product, are correspondingly easy to establish and to change when necessary. Stability is also a function of the degree to which the needs of customers change over time and how well these changes can be monitored. The staff unit's clients, the line departments, do change their operations in response to changes in their task environments. Consequently, the nature of the line departments' demands on the staff unit may change. The task uncertainty induced by these changes, however, is relatively low. The existence of formal staff – line communication links allows the nature of the new demands to be specified to the staff manager. In addition, the communication channels also allow the manager to monitor the effectiveness of any new services. There is little uncertainty, therefore, in the determination of the response to new demands or in gauging the effectiveness of the response.

The clients of service and functional control staffs are also relatively homogeneous, another factor that contributes to a comparatively low level of task uncertainty. The staff units' customers belong to the same organization and thus share the entity's 'culture'. More importantly, the customers' expectations of the staff unit are not ill-defined. The nature and content of staff – line interdependences, even though they differ across line departments, are normally explicitly stated in job descriptions and departmental charters. The staff manager knows what customers expect of the staff unit, something line managers can have trouble determining.

As with most generalizations, the characterization of service and functional control departments as insulated units is not universally valid. Certain staff departments can be what Thompson calls 'boundary spanning units' and interact with an unpredictable external task environment. For example, the purchasing department in a company distributing clothing or home furnishings would likely be classified as an open unit. It must monitor changes in fashions and, therefore, its manager is subject to considerable task uncertainty. A maintenance department charged with the support and repair of highly technical equipment might be another example of a boundary-spanning unit subject to significant task uncertainty. These examples, however, are atypical. It is probably fair to say that the *average* service and functional control staff unit has a task environment within the entity's boundaries. Along with the considerations mentioned in the preceding paragraphs, this gives an insulated character to such departments.

Performance Metrics in Units Using ZBB

The Hirst model predicts that dysfunctional behaviour is minimized when internal accounting and interdependency measures are used in the evaluation of insulated units. Researchers who have investigated performance evaluation in staff units observe that such measures are employed in practice. Anthony and Herzlinger (1980, Chap. 6) note that a mixture of 'process measures' and 'output measures' should be and generally are used to review the performance of cost centres. The examples they give of each type suggest that process measures are internal accounting measures; output measures are primarily interdependency measures. Anthony and Herzlinger's listing of cost centres to which the observation applies includes a number of service and functional control departments. Letzkus (1978) discusses staff units within governmental and military organizations and his observations parallel those of Anthony and Herzlinger.[1] Finally, Thompson (1967, pp. 93-4) observes that insulated units are largely evaluated on the basis of cost, quantity, quality, and efficiency dimensions. The examples he provides for each dimension are basically internal accounting measures. He adds that these dimensions are often used in conjunction with interdependency measures, particularly when the unit has an identifiable clientele.

All of these writers stress both the desirability and practice of evaluating managers on the basis of more than one measure. Indeed, this appears to be a common theme among researchers in the performance evaluation area (Drucker, 1954, Chap. 5; Ridgway, 1956; Benston, 1970; Rappaport, 1970, pp. 404-5; Lawler and Rhode, 1976, pp. 95-6; Otley, 1978; Szilagyi and Wallace, 1983, pp. 375-6). These authors note that a single performance measure is inherently myopic as it focuses on only one attribute. In practice, multiple measures are employed to give recognition to the numerous and oftentimes independent dimensions of manager performance.

Increasing Degrees of Openness and Task Uncertainty

When ZBB is employed, the manager chooses an output measure for the department and then prepares forecasts for the measure at different budget levels. These forecasts and associated budget requirements are forwarded as packages to the budget committee. The packages cover a wide range of budget levels and the budget committee is empowered to select any one of them. It is this aspect of ZBB that makes the department more open. The decisions of the budget committee (an external entity) can have dramatic effects on what resources are allocated to the manager and what tasks the manager's department performs. The activities of the department are more open to 'external stimuli' and, consequently, the department has less of an insulated character than under traditional budgeting systems.

Because of the structure of the ZBB design, this increased openness leads to a higher degree of uncertainty for the reporting manager. Compared to traditional budgeting systems, the manager in a ZBB setting is forced to interact with an external decision maker (the budget committee) that has a greater degree of control over tasks the department undertakes and, consequently, what the department accomplishes. In Thompson's terms (1967, p. 118) the manager has lost a substantial measure of autonomy. The manager's ability to control the resources and activities of the department, free of the influence of outsiders, has been reduced. With the loss of autonomy, the manager's environment is more uncertain.[2] The manager does not have complete knowledge of either the constraints on the budget committee or the packages submitted by other departments. The manager also does not know what the decision process will be. This reduces the manager's ability to predict what will happen and hence increases the uncertainty of the task environment.

---

[1] Letzkus (1978) and McCandless (1978) both discuss performance evaluation metrics in the context of ZBB. They are concerned with the dangers of quantifying performance measures for units in which output is difficult to measure.

[2] We use the general definition of Hickson, Hinings, Lee, Schneck and Pennings (1971, p. 219) that 'uncertainty may be defined as a lack of information about future events, so that alternatives and their outcomes are unpredictable'.

Compounding the problem is a new reciprocal relationship that develops between the manager and the budget committee. In ZBB the budget committee is empowered to request more information or package revisions from the manager. This probing into the tasks and organization of the department is a process the manager cannot control. Like the decisions of the budget committee, the requests for information and the uses to which the information are put are unpredictable.

A final source of increased uncertainty has to do with the manner in which the reporting department is analysed in ZBB. As the larger organization moves from traditional budgeting systems to ZBB, the unit of analysis in the budgeting process is switched from an overall departmental allocation to a project allocation (see Cyert and March, 1963, pp. 274-5). ZBB forces the manager to explicitly relate the separable activities of the department to the funding the department receives. The manager submits proposals to fund not the entire department, but individual projects. This is a new task for the manager: Now it is necessary to portray the department as a portfolio of tasks rather than as a total entity. Moreover, there will be uncertainty surrounding how the results of the effort will be used by the budget committee. The manager is depicting his department in a new way to a budget committee empowered to invoke dramatic changes. From the manager's standpoint, exactly how the budget committee will process this new information is unpredictable and, hence, adds to the level of uncertainty.

Incomplete Performance Measures and Incentives to Engage in Dysfunctional Behaviour

The Hirst model posits that incentives to engage in dysfunctional behaviour are in part a function of the degree of completeness of the performance measures used to evaluate the individual. Completeness refers to the ability of the performance measures to reflect the outcomes of the tasks assigned to the individual. Hirst's model holds that completeness is relative, it will change in different situations. More specifically,

> internal performance measures [i.e., internal accounting measures] can be expected to be relatively complete where task uncertainty is low . . . However, where task uncertainty is high, internal [accounting] measures can be expected to be relatively incomplete because environmental and/or interdependency measures capture the important outcomes associated with such tasks. (1981, p. 774)

The previous section concluded that the imposition of ZBB increases the level of uncertainty for the manager. The uncertainty is due to the unpredictability of the budget allocation. Within the context of the evaluation systems of the staff units that employ ZBB, the higher level of general uncertainty will induce a higher level of task uncertainty. In technical terms, there will be an erosion of managers' beliefs in the cause – effect relationship of their actions. Managers will be less certain of the outcomes associated with their performance. This occurs because of (a) the performance measures used to evaluate the types of departments that employ ZBB and (b) the unpredictability of the budget allocation.

The packages the manager sends to the budget committee forecast one output measure at several different budget levels. While the manager is free to define the forecasted output measure in any reasonable manner, usually the measure chosen is a close derivative of one of the manager's performance metrics. The system design of ZBB encourages this practice (see Austin and Cheek, 1979; Pattillo, 1977; Dillon, 1979) and it has often been observed in case studies of the application of ZBB (see Herzlinger, 1979; Minmier and Hermanson, 1977; and Cleaveland, 1977). The manager's other performance measures are left unforecasted. If the recorded outcomes of these 'other' measures are functionally related to the budget level (i.e., the budget allocation will affect the measurement of the performance metric), the manager's level of task uncertainty increases because a variable beyond the manager's control (the budget allocation decision) becomes a determining variable of the subsequent recorded measures of the manager's performance. What the manager *does* now bears an uncertain relationship to the recorded measures of performance. The measurement of performance under ZBB thus becomes a joint function of manager's causal actions (which are controllable) and the budget allocation decision (which is uncontrollable). It is the uncontrollable nature of the latter decision that increases the level of task uncertainty.

A simple example may illustrate this. Consider the municipal billing department mentioned earlier. Assume its present staff consists of the manager, a billing supervisor, and two experienced clerks. While the department currently handles only property tax billings, its role could be expanded to handle other types of billings as well. Its scope of activities could also be reduced by lengthening the time it takes to prepare and mail bills and by reducing the functions of the supervisor. Therefore, several activity levels are possible, some below and some above the current activity level. As illustrated in Table 1, the manager identifies six feasible levels of output: the current level (package C), two below the existing level (packages A and B), and three above the current level (packages D, E, and F). The lower levels require reducing the employment of some staff to half-time. The higher levels require the employment of additional staff. The manager decides that total cost and the number of billings processed per month are the most appropriate measures to represent the comparative performance characteristics of the four packages. Using knowledge of the department's production function, the manager forecasts the costs and the billing volumes listed in the third and fourth columns. Assume the manager is evaluated not only on total cost and total quantity dimensions but also on efficiency and quality dimensions as well. The latter two are operationalized by two internal accounting dimensions: billings per employee and errors per 100 billings. Assume also that two other managers, the municipal treasurer and municipal assessor, prepare written evaluations of the manager's performance. These evaluations are interdependency measures and rate the manager on a number of characteristics such as leadership, cooperativeness, etc. They also evaluate the quality of service provided by the billing department to the treasurer's and assessor's offices. Since the billing manager believes that the department's output and its quality of work will not be the same across the activity levels forecasted in the packages, the manager's expectation is that the results of the unforecasted performance measures will be as indicated in the final four colums of Table 1. (An overall grade is given for the interdependency measures to summarize the expected character of the evaluation.) What is noteworthy is that *all six performance measures* vary with the activity level.

The system design of ZBB specifies that the manager's role is to objectively define the

TABLE 1

MUNICIPAL BILLING DEPARTMENT EXAMPLE: IDENTIFIED PACKAGES, STAFFING REQUIREMENTS, AND PROBABLE REALIZATIONS OF SIX PERFORMANCE MEASURES

		Forecasted performance measures		Unforecasted performance measures			
Package	Staff employed (supervisor – experienced clerks – inexperienced clerks)	Cost	Volume per month	Billings per employee	Errors per 100 billings	Treasurer's evaluation	Assessor's evaluation
A	1/2 – 1 1/2 – 0	21,000	2,600	1,300	.013	C+	C
B	1/2 – 2 – 0	26,000	3,500	1,400	.010	B	B−
C	1 – 2 – 0	32,000	4,000	1,333	.010	B	B+
D	1 – 2 – 1	42,000	5,200	1,300	.018	B+	B+
E	1 – 2 – 2	52,000	6,200	1,240	.025	A	B+
F	1 – 2 – 3	62,000	7,000	1,167	.031	A	A−

packages. The only formally designated avenue for the manager to influence the budget decision is through the manager's ranking of the packages. With the budget decision in the hands of an external committee, a major determinant of the outcome of the manager's performance measures is placed beyond the manager's control. The tie or correlation between performance on the job and the recorded outcomes of the manager's performance measures then becomes more problematical. For example, the manager may believe that achieving the recorded outcomes for package A, given its funding level, may be indicative of superb performance. This would not be reflected, however, in the measures used to gauge the manager's accomplishments. If compared to the current situation (package C), the manager's performance would appear to have declined. Effectively, the manager's level of task uncertainty has increased. The connection between the manager's causal actions (i.e., the manager's performance) and the effects of the actions (i.e., the manager's measures of accomplishments) has eroded.

The problem does not arise because of the performance measures explicitly forecasted in the packages. The total cost and total quantity measures, which would be considered internal accounting measures under traditional budgeting systems, become similar in character to environmental measures in a ZBB framework. The operating targets specifying acceptable performance are made contingent upon the budget level. As the budget level is imposed upon the manager, the budget allocation becomes an environmental constraint with which the manager must cope. Allowing the operating target to vary with the budget level gives appropriate recognition to the higher level of task uncertainty. The source of the problem is the unforecasted internal accounting and interdependency measures. Even though these measures vary with the activity level, the operating targets for them are not explicitly adjusted. They remain internal accounting and unadjusted interdependency measures which, within the Hirst model, are inappropriate for use in the performance evaluation of units possessing higher levels of task uncertainty. They are *incomplete* in the sense they do not capture a key variable (the budget level) associated with task performance. The Hirst model holds that use of these measures in performance evaluation will induce tension. As tension increases, the model holds that 'individuals seek relief by engaging in dysfunctional behaviour (i.e., resistance, rigid bureaucratic behavior, strategic behavior, and invalid data reporting)' (1981, p. 777).

It is not clear from Table 1 exactly which package the manager will prefer. The performance measures are not optimized in any one package. Echoing Ridgway's (1956) critique of the reaction to multiple-performance criteria, the manager's preference will be governed by the manager's subjective perception of the priorities of the organization. If the manager believes the organization attaches comparatively greater importance to internal accounting measures, packages B or C might be favoured. Packages E or F might be favoured if interdependency measures are more heavily weighted. Whatever the assessment, the manager will not be indifferent to the package chosen and will prefer the one likely to result in the highest performance evaluation. Consequently, the manager will have strong incentives to encourage its selection. If the preferred package is coincidentally the one that best meets the organization's objectives, there is no problem from the organization's point of view. Incentives to engage in dysfunctional behaviour arise when such symmetry does not exist. In this case, selection of the preferred package can be achieved only by resorting to the dysfunctional reporting strategies discussed earlier.

POSSIBLE MODIFICATIONS TO ZBB PROCESSES AND PERFORMANCE EVALUATION SYSTEMS

The basic proposition of the preceding discussion is that the dysfunctional behaviours observed in ZBB applications may be due, to a certain degree, to the increase in task uncertainty induced by the budgeting system. If this proposition is confirmed, several modifications can be made to ZBB processes to lessen the incentives to employ dysfunctional reporting strategies. The central aim of all the modifications is to make the manager's performance metrics more complete. The most obvious is to allow reporting managers to forecast a number of performance metrics, both qualitative and quantitative, in their ZBB packages. This would give the performance measures a character similar to environmental measures if: (a) the forecasts are considered to represent flexible operating targets and (b) the forecasts are also *explicitly* incorporated on an *ex ante* basis into the evaluation system as specifications of acceptable performance. While simple in concept, this step does not appear to be normal practice,[3] perhaps because this alteration is difficult to accomplish in many instances.

---

[3] Three sources of evidence support this conclusion. First, no publication describing the procedures of ZBB mentions the need for this alteration. Performance measures are discussed in these manuals, but the coverage is restricted to descriptions of how to design the forecasted measure. (See, e.g., Austin and Cheek, 1979; Pattillo, 1977; Stonich, 1977; Knight, 1979; and Dillon, 1979). Second, *no* case study of a ZBB application mentions observing a change in the design of performance metrics or their associated targets. Several of these case studies are detailed (see, e.g., Herzlinger, 1979; Minmier and Hermanson, 1977, and Cleaveland, 1977) and all describe evaluation procedures. Third, discussions with individuals who have been actively engaged in ZBB applications reveal that while a number of performance metrics are used to evaluate managers who prepare ZBB packages, most of these performance measures are not explicitly or implicitly considered in the system procedures when packages are actually being prepared.

This alteration requires a degree of coordination between budgeting and evaluation systems. In smaller organizations both systems are administered by one department and such coordination is not difficult to achieve. However, in larger entities, such as governments, regulated monopolies, and military organizations, the budgeting and evaluation systems often are controlled by separate staff units with their own perquisites. Moreover, frequently there exist multiple evaluation systems, each focusing on different measures of performance and administered by separate staffs (Letzkus, 1978; Anthony and Herzlinger, 1980, pp. 245-6). Consequently, coordination in these situations is more difficult to accomplish. Finally, firms may not be able to overcome the control difficulties caused by having managers establish their own standards (see Lawler and Rhode, 1976, pp. 49-50).

An alternative is for the firm to require evaluators to make their interdependency assessments contingent upon the budget level selected for the department. Again, to be effective this policy must be incorporated into the announced design of the ZBB application. It must be done on an *ex ante* basis. Managers must be aware *before* they make their package submissions that evaluators will consider their funding levels. An unannounced intention to make *ad hoc* adjustments after a performance period accomplishes little as far as the objectives of ZBB are concerned.

Again, because it can be difficult to coordinate budgeting systems and evaluation systems, this straightforward idea may be difficult to implement. A more troublesome area is the reliability problem of the *ex post* evaluations. Knowledge of the reporting department's production function is generally imperfect. Therefore, it will be difficult for evaluators to determine the constraints imposed by lower funding levels and opportunities offered by higher levels. As a result, evaluators' contingent evaluations will be subject to considerable measurement error. From the reporting manager's point of view, the expected measurement error would be largest for packages with the greatest proposed change in budget levels (for example, packages A and F in Table 1). Because measurement error increases the degree of incompleteness in performance measures, the manager may be biased against these.

This problem can be addressed by establishing a policy that a panel of expert judges would be employed to serve as evaluators when sizeable budget changes are made (see Szilagyi and Wallace, 1983, pp. 366-7). This step would mean removing the department's clients from the performance evaluation process for a period of time. Whatever committee is used to review the internal accounting measures also would be removed from the evaluation process. In place of these two groups, a committee of knowledgeable and supportive individuals would, in consultation with the manager, establish a new job description and formulate new operating targets. In addition, this new committee would be charged with informing the department's customers about the new service levels that can be expected. The aim of this step is to locate the best source of information about what can be expected of the manager when substantial changes are made in the manager's budget level. This step gives recognition to the fact that the best source of performance evaluation may not be the existing clients and evaluators who have become accustomed to particular service levels.

If used in judicious combination, these steps may reduce incentives to employ dysfunctional reporting strategies, but it would be unreasonable to expect these modifications to eliminate them. Therefore, it still may be necessary to establish some external check to verify that the ZBB system is providing realistic alternatives. Pattillo (1977) and Austin and Cheek (1979) suggest operational auditing techniques be used to assess the reliability of package submissions. This step would be costly, but it may serve to indicate that higher management takes the ZBB system seriously.

CONCLUDING COMMENTS

Probably all budgeting systems induce dysfunctional behaviour of some kind. Moreover, the kind of behaviour engendered will differ both across systems and across organizations. It is largely because of this realization that techniques such as ZBB, Program Planning and Budgeting Systems (PPBS), and participatory budgeting receive a lukewarm reception from many academic accountants. Rappaport, for example, observes that 'attempts to articulate generic, all-purpose strategies are not likely to be very compelling because the relationships among key variables influencing behavior are not uniform in different organization settings' (1970, p. 403). He argues that within the budgeting literature more attention needs to be given to a specification of the variables influencing behaviour and to the interaction of the variables in different environments.

This paper discusses the configuration of performance evaluation measures and task uncertainty in the context of ZBB. The aim is to make ZBB a better method for allocating resources by reducing incentives to engage in the dysfunctional reporting strategies often observed in ZBB applications. The recommendations presented in the last section of the paper are designed to achieve this goal.

REFERENCES

Amiess, A. P., 'Application of Zero-Base Budgeting', *Managerial Planning*, March/April 1982.

Anthony, R., and R. Herzlinger, *Management Control in Nonprofit Organizations*, Richard D. Irwin, 1980.

Austin, L., *Zero-Base Budgeting: Organizational Impact and Effects*, AMACOM, 1977.

Austin, L., and L. Cheek, *Zero-Base Budgeting*, AMACOM, 1979.

Becker, S., and D. Green, 'Budgeting and Employee Behavior', in A. Rappaport (ed.), *Information for Decision Making*, Prentice-Hall, 1970.

Benston, G., 'The Role of the Firm's Accounting System for Motivation', in A. Rappaport (ed.), *Information for Decision Making*, Prentice-Hall, 1970.

Birnberg, J., L. Turopolec, and S. Young, 'The Organizational Context of Accounting', *Accounting, Organizations, and Society*, Vol. 7, No. 2, 1982.

Burton, V., and S. Cowen, 'The Use of Zero-Base Budgeting in Industry: Some Observations', *Interfaces*, August 1979.

Cleaveland, J., 'Local Government Retrenchment and Zero-Base Budgeting', in J. Hebert (ed.), *Experience in Zero-Base Budgeting*, PBI Books, 1977.

Cowen, S., 'Zero-Base Budgeting: Where and How It Has Worked', *Business*, May/June 1979.

Cowen, S., and B. Dean, 'The Use of Zero-Base Budgeting in Local Government: Some Observations', *Interfaces*, April 1979.

Cowen, S., and G. Shovlin, 'Zero-Base Budgeting in Perspective', *Cost and Management*, May/June 1982.

Cyert, R. M. and J. G. March, *A Behavioral Theory of the Firm*, Prentice-Hall, 1963.

Dean, B., and S. Cowen, 'The Use of Zero-Base Budgeting in Industry: Some Observations', *Interfaces*, April 1979.

Dillon, R. D., *Zero-Base Budgeting for Health Institutions*, Aspen Systems Corp., 1979.

Drucker, P., *The Practice of Management*, Harper and Row, 1954.

Fogarty, A., and A. Turnbull, 'Legislative Oversight Through a Rotating Zero-Base Budget', *State and Local Government Review*, January 1977.

Gordon, L. A., S. Haka, and A. G. Schick, 'Strategies for Information Systems Implementation: The Case of Zero-Base Budgeting', *Accounting, Organizations and Society*, Vol. 9, No. 2, 1984.

Hebert, J., *Experiences in Zero-Base Budgeting*, PBI Books, 1977.

Herzlinger, R., 'Zero-Base Budgeting in the Federal Government: A Case Study', *Sloan Management Review*, Winter 1979.

Hickson, D. J., C. R. Hinings, C. A. Lee, R. E. Schneck, and J. M. Pennings, 'A Strategic Contingencies Theory of Organizational Power', *Administrative Science Quarterly*, June 1971.

Hill, C. E., and T. Sharp, 'Zero-Base Budgeting: A Practical Application', *Governmental Finance*, March 1983.

Hirst, M., 'Accounting Information and the Evaluation of Subordinate Performance: A Situational Approach', *The Accounting Review*, October 1981.

———, 'Reliance on Accounting Performance Measures, Task Uncertainty, and Dysfunctional Behavior: Some Extensions', *Journal of Accounting Research*, Autumn 1983.

Hofstede, G., *The Game of Budget Control*, Van Gorcum & Co., 1967.

Hopwood, A., 'An Empirical Study of the Role of Accounting Data in Performance Evaluation', *Empirical Research in Accounting: Selected Studies, 1972,* supplement to Vol. 10, *Journal of Accounting Research.*

Knight, H. C., *Zero-Base Budgeting Process: A Practical Guide to Evaluation, Implementation, and Use*, Society of Management Accountants of Canada, 1979.

Lawler, E., and J. Rhode, *Information and Control in Organizations*, Goodyear Publishing Co., 1976.

Letzkus, W., 'Zero-Base Budgeting: Some Implications of Measuring Accomplishments', *Government Accountants Journal*, Summer 1978.

McCandless, H., 'Behavioral Side of Zero-Base Budgeting', *CA Magazine*, November 1978.

McGinnis, J., 'Pluses and Minuses of Zero-Base Budgeting', *Administrative Management*, September 1976.

Minmier, G., and R. Hermanson, 'A Look at Zero-Base Budgeting—The Georgia Experience', in J. Hebert (ed.), *Experience in Zero-Base Budgeting*, PBI Books, 1977.

Moore, F., *Management: Organization and Practice*, Harper and Row, 1964.

Otley, D., 'Budget Use and Managerial Performance', *Journal of Accounting Research*, Spring 1978.

Pattillo, J., *Zero-Base Budgeting: A Planning, Resource Allocation and Control Tool*, NAA, 1977.

Phyrr, P., 'Zero-Base Budgeting: How to Get Rid of Corporate Crabgrass', in J. Hebert (ed.), *Experiences in Zero-Base Budgeting*, PBI Books, 1977.

Rappaport, A., *Information for Decision Making*, Prentice-Hall, 1970.

Ridgway, V., 'Dysfunctional Consequences of Performance Measurements', *Administrative Science Quarterly*, September 1956.

Rubinyi, P., 'ZBR Instead of ZBB', *CA Magazine*, April 1980.

Sherlekar, V., and B. Dean, 'Evaluation of the Initial Year of Zero-Base Budgeting in the Federal Government', *Management Science*, August 1980.

Singleton, A., B. Smith, and J. Cleaveland, 'Zero-Base Budgeting in Wilmington, Delaware', in J. Hebert (ed.), *Experiences in Zero-Base Budgeting*, PBI Books, 1977.

Stedry, A., 'Budgeting and Employee Behavior: A Reply', in A. Rappaport (ed.), *Information for Decision Making*, Prentice-Hall, 1970.

Stonich, P., *Zero-Base Planning and Budgeting*, Richard D. Irwin, 1977.

Suver, J., and R. Brown, 'Where Does Zero-Base Budgeting Work?', *Harvard Business Review*, November/December 1977.

Szilagyi, A., and M. Wallace, *Organizational Behavior and Performance* (3rd edn), Scott Foresman and Company, 1983.

Taylor, G., 'Introduction to Zero-Base Budgeting', in J. Hebert (ed.), *Experiences in Zero-Base Budgeting*, PBI Books, 1977.

Thompson, J., *Organizations in Action*, McGraw-Hill, 1967.

Watkins, W., 'Evaluating ZBB', *Managerial Planning*, September/October 1978.

Wholey, J., *Zero-Base Budgeting and Program Evaluation*, Lexington Books, 1978.

Williams, J., 'Zero-Base Budgeting: Prospects for Developing a Semi-Confusing Budgeting Information System', *Accounting, Organizations and Society*, Vol. 6, No. 2, 1981.

ABACUS, Vol. 24, No. 2, 1988

THOMAS L. BARTON

Intuitive Choice of Cooperative Sharing Mechanisms for Joint Cost Savings: Some Empirical Results

Cooperative sharing arrangements are common phenomena in modern business. Joint ventures are used in a variety of industries, where participants are provided the advantages *inter alia* of risk sharing, pooling of economic and managerial resources, and synergy. An important issue in any cooperative venture is the *mechanism* for sharing the common rewards of participation. While some studies have looked at *actual* ventures, the issue has not been explored empirically when alternative sharing arrangements were also under consideration and the practical considerations of 'fairness', 'reasonableness', and 'understandability' were also present. This study examines sharing arrangements proposed by neutral observers under experimental conditions to a potential cooperative sharing arrangement where these practical considerations are important. The results indicate that the more complex literature solutions were approximated by some neutral observers intuitively, but the more pragmatic literature solutions were chosen by most observers.

Key words: Joint ventures; Rewards; Sharing.

1. INTRODUCTION

Cooperative sharing arrangements are common phenomena in modern business. Joint ventures are routinely used in industries as diverse as construction, public utilities, and motion picture production. They offer participants the advantages of risk sharing, pooling of economic and managerial resources, and synergy. An important issue in any cooperative venture is the mechanism for sharing the common rewards of participation. These rewards are often in the form of cost savings: Under conditions of economies of scale, it is less costly to pool requirements for a commodity than to acquire the commodity alone.

But potential participants must *agree* to the sharing arrangement. It cannot be imposed on them (see assumption 1 below). It is here that solutions proposed in the literature and the behavioural dynamics of an actual venture may come into conflict. A solution must yield results that seem 'fair' and 'reasonable' yet 'understandable'. Otherwise, potential participants can refuse to cooperate in the venture.

While some studies have looked at actual ventures (Segal, 1970; Gately, 1974;

THOMAS L. BARTON is Associate Professor, University of North Florida, Florida.

Loehman, Orlando, Tschirhart and Whinston, 1979), the issue has not been explored empirically when alternative sharing arrangements were available and the practical considerations of 'fairness', 'reasonableness', and 'understandability' were present. This study examines sharing arrangements proposed by neutral observers under experimental conditions to a potential cooperative sharing arrangement where these practical considerations are important.[1] The proposed arrangements were then compared to alternative solutions offered in the literature to identify those that can be approximated 'intuitively'.

In this study the more complex literature solutions were approximated by some neutral observers intuitively, but the more pragmatic literature solutions were the ones most commonly chosen by the observers. Further, the results show that when the neutral observers were forced to abandon pragmatic solutions, in some cases they 'discovered' a complex method intuitively, but most often they could not arrive at a different, acceptable solution at all.

The remainder of this paper is organized as follows: Section 2 contains a discussion of the research issues. In Section 3, the methodology employed in the research is presented. Section 4 contains the results of the experiment, and a discussion of those results. Finally, the conclusions, and implications of the study are presented in Section 5.

2. RESEARCH ISSUES

A rich and diverse theoretical literature has emerged over the last thirty years offering solutions to the problem of sharing cooperative savings. At one end of the spectrum, some solutions have been formed under complex game-theoretic approaches (Luce and Raiffa, 1957), while at the other end of the spectrum, practical 'accounting type' solutions have been offered (Moriarity, 1975). As would be expected, often the solutions are widely divergent.

It is typically assumed in any analysis of a cooperative sharing mechanism that potential participants in a cooperative venture will behave in accord with certain rules:

1. Participants are endowed with free will: Before the venture is solidified, they may leave the venture or stay in the venture as they choose.[2]
2. Participants will stay in the venture when it is in their best interests: They will stay if their individual shares of the savings exceed zero and no better opportunities exist.
3. Participants will form sub-ventures when it is in their best interest: For example, if two participants can share greater savings by leaving the venture and forming their own two-person venture, they will do so.

While no one can doubt the validity of assumptions 2 and 3 when considering participants who are rational, economic beings, the assumptions fail to reflect the dynamics of participants' bargaining positions. For example, X, Y, and Z are potential participants in a cooperative venture that would result in cost savings. X will use more of the commodity than Y but the sharing arrangement favoured by Y and Z will grant more of the savings to Y than X. X threatens to abandon the venture if forced by the others to agree to the sharing arrangement. Here X is potentially better off by agreeing to *any* sharing arrangement resulting in a net saving, and assumption 2 should hold. But X's own bargaining position precludes accepting the arrangement. The implication is that there must be some consensus among participants as to the 'fairness' or 'reasonableness' of the sharing arrangement.

---

[1] This can be compared to the function of an independent arbitrator in a dispute.

[2] This is not a trivial assumption in some cases. Participants who are all part of a larger organization are often restricted in their choices, such as divisions of one company. This can be an important factor in transfer pricing situations.

Another consideration has to do with the complexity of the sharing mechanisms. Some proposed solutions employ intricate mathematical analysis that might not be readily understood by the participants. It is unlikely that participants will agree to an arrangement that is incomprehensible to them. Yet it may be the case that complex mathematical arrangements have close surrogates in real sharing situations; surrogates that could be arrived at through intuition. In other words, the complex arrangement can be approximated intuitively.

Finally, it might happen that the available practical solutions to a sharing problem are unacceptable to the participants.[3] When this constraint is introduced, is there an increase in the likelihood of a complex arrangement being approximated intuitively?

These issues were explored in an experiment where neutral observers proposed sharing solutions under imposed constraints of 'reasonableness', 'fairness', and 'understandability'.

3. METHODOLOGY

Procedure

One hundred and nineteen (119) Master of Business Administration and Master of Accountancy students participated in the experiment as subjects. They came from diverse backgrounds and job experience. For example, 43% held undergraduate degrees in accounting, 31% in other business subjects, and 26% in non-business subjects. Also, 30% worked in accounting positions and 27% in general business or management. Twenty-eight per cent (28%) were full-time students. Their average age was 31.

The students were enrolled in graduate business programs where most students hold full-time professional jobs and attend classes at night. One should not expect, then, to encounter the normal difficulties with using students as surrogates for business or professional decision-makers. There was no significant difference in results ($p = 0.05$) associated with degree program, undergraduate major, age, job type, full-time student designation, or whether subjects performed allocation tasks at their jobs similar to the experimental task.

The experimental instrument (Appendix) required the subjects to arrive at a sharing solution for a group of three farmers interested in pooling their purchases of a livestock feed to take advantage of quantity discounts. Data were included as to usage, costs, and savings for the three-person group and all possible sub-groups.[4] Subjects were told, 'There is a danger that if one farmer doesn't feel that he's getting enough of the savings, he'll decide not to join with the other two in the purchasing'.

---

[3] For example, Hamlen, Hamlen and Tschirhart (1977) have shown that Moriarity's method, a practical method, can yield results causing negative outcomes associated with assumptions (2) and (3) under certain conditions. The literature generally assumes that a method should not do this.

One group of subjects (Group 1) received the basic instrument. A later group (Group 2) received a modified instrument. The modification was designed to remove the two practical solutions from subject consideration.[5]

The experiment was administered during regular class periods with adequate time given for its completion. The subjects were advised that the 'case' was an exercise in judgement and that there were no 'right answers'.

Data Analysis

Subject responses were compared to four methods found in the literature and two methods derived from a general measure suggested in the literature. The six methods (subsequently referred to as 'existing solutions') are as follows, classified as to 'practical' or 'complex':

1. *Activity Method*—Assigns costs in direct proportion to usage. Results in a constant cost per unit across all participants. A common accounting technique. *Practical.*
2. *Moriarity's Method* (Moriarity, 1975)—Assigns savings in direct proportion to usage. *Practical.*
3. *Shapley Value* (Explained in Segal, 1970, among others)—Expected value solution assuming equal probability for any participant's entry into the overall group or a sub-group. The most common theoretical method cited in the literature. *Complex.*
4. *Nucleolus* (Schmeidler, 1969)—A constrained optimization solution seeking to maximize the advantage of the least well-off participant or sub-group.[6] *Complex.*
5. *Equal Propensities to Disrupt* (PD) (Gately, 1974)[7]—A solution that sets all participants' PDs equal to each other. *Complex.*
6. *Minimum Total Propensity to Disrupt*—A solution that finds the outcome yielding the smallest sum total of the individual participants' PD. *Complex.*

The solutions to the experimental problem for each method are shown in Table 1.

---

[4] The information for sub-groups was included to allow the subjects to consider the possibility of less than complete cooperation.

[5] Subjects were told that these solutions had been explored and rejected because for each method, one of the participants had refused to accept shares perceived as too small. For example, under the activity method, Farmer C receives a smaller share of the savings than Farmer B even though C had a greater usage of the commodity.

[6] In the experimental instrument, the nucleolus method yielded a range of equally feasible solutions. There is no guidance in the literature for this situation. Somewhat arbitrarily, the solution for the experimental instrument was set at the midpoint of the ranges.

[7] The PD concept was introduced by Gately but the applications were devised by the author.

TABLE 1
SUMMARY OF SOLUTIONS FOR ESTABLISHED METHODS

Method	Participant A	Participant B	Participant C
Activity	30	34	32
Moriarity	16	32	48
Shapley	26	34	36
Nucleolus	21	35	40
Equal Propensities to Disrupt	25	34	37
Minimum Propensities to Disrupt	28	33	35

A subject response was assigned to an existing solution (or none at all) as follows:[8] For each subject, the share allotted to a farmer was compared with the share under an existing solution. That difference was squared[9] and the three squared differences for each subject's solution were summed. The existing solution with the smallest sum of squares for a given subject was chosen as that subject's intuitive solution. However, if the square root of the total smallest sum of squares was greater than about 7 per cent[10] of the total savings, the response was classified as 'non-response'. Only four responses were so classified.

4. RESULTS

The results of the experiment are summarized in Table 2.

TABLE 2
CROSS CLASSIFICATION BETWEEN METHOD AND EXPERIMENTAL GROUP

METHOD	Group 1	Group 2	Total
Activity	11 (17%)	20 (36%)	31 (26%)
Moriarity	48 (75%)	14 (25%)	62 (52%)
Nucleolus	1 (2%)	7 (13%)	8 (7%)
Equal Propensities to Disrupt	3 (4%)	9 (16%)	12 (10%)
Minimum Propensities to Disrupt	0 (0%)	2 (4%)	2 (2%)
Non-Response	1 (2%)	3 (6%)	4 (3%)
Total	64 (100%)	55 (100%)	119 (100%)

Overall test of significant difference between Group 1 and Group 2 Results: $\chi^2 = 29.98$ with 4 degrees of freedom, $p < 0.0001$

The vast majority (75%) of Group 1 subjects selected a solution consistent with the Moriarity method, while considerably fewer (17%) choose an activity approach. Only 6% chose a solution similar to a complex method: 4% for equal propensities to disrupt and 2% for nucleolus.

---

[8] One post-experiment question asked the subjects to explain how they arrived at an allocation. No attempt was made to analyse these responses as many were unusable.

[9] The squaring of the difference ensures that differences are accentuated to a greater degree the farther a solution moves from an existing solution.

[10] This criterion was chosen based on inspection of the distribution of total minimum squared differences. The square root of the mean of this distribution was 4 per cent of the total savings.

When Group 2 subjects were encouraged to choose a complex solution (an approach other than Moriarity or activity), 61% still chose a practical solution: 25%, the Moriarity method and 36%, the activity method. The percentage for all complex methods increased from 6% to 33%. The equal propensities to disrupt percentage rose from 4% to 16%, Nucleolus from 2% to 13%, and minimum total propensity to disrupt from 0% to 4%. The Shapley method was not represented in the results of either group.

The results for the two groups were significantly different as measured by the chi-square test ($\chi^2 = 29.98$, $df = 4$, $p < 0.0001$).[11]

The results are consistent with neutral observers intuitively choosing practical solutions to cooperative sharing problems. This is not difficult to accept when one realizes that both methods arose from the desire for an intuitive solution. The results are also consistent with neutral observers occasionally choosing complex solutions that emulate established theoretical methods.

When neutral observers are 'forced' away from one practical method, they seem to gravitate to another practical method although both practical methods were 'wrong' in Group 2.[12] Here it seems to be demonstrated that the impetus toward choosing a practical method is strong. But when 'forced' away from the practical methods, there was a fivefold increase in the percentage of observers willing to adopt a complex solution.

5. CONCLUSIONS

The results indicated that the neutral observers were most comfortable with the two practical sharing solutions. A few observers arrived intuitively at an established complex solution when no practical solutions were excluded. When practical solutions were not feasible or were unacceptable to the participants, significantly more observers intuitively developed solutions that emulated complex solutions. But there appeared to be a strong compulsion to retain a practical method even at the expense of its being unacceptable to the cooperative participants.

It is interesting that the method most cited in the literature appears to be the least intuitive, the Shapley value. No subjects out of 119 chose a solution that emulated it. But the result for Shapley was very close to equal propensities to disrupt (see Table 1). Consequently, definitive conclusions about the Shapley value await further study.

It remains to be determined how observers are able to arrive at reasonable emulations of established complex methods, especially the nucleolus and minimum total propensity to disrupt methods whose formulae are complex indeed. It may be that such emulation is not possible under different sharing scenarios. In some respects, however, the equal propensities to disrupt method is quite intuitive and in at least one instance, a subject reasoned the calculations exactly.

---

[11] Another chi-square test was run on the cross-classificational table in which the cells from the original table were collapsed into the categories, practical and complex. The results for Group 1 and Group 2 remained significantly different ($\chi^2 = 14.71$, $df = 1$, $p < 0.0001$).

[12] They were 'wrong' in the sense that either practical solution would presumably cause one farmer not to cooperate.

It seems to be time to bridge the gap between the extensive theoretical literature on cooperative sharing methods and the practical implemental difficulties of applying the methods. This study used one particular set of facts and therefore extrapolation of the results may be done only very tenuously. It should be viewed, therefore, as one small step toward applying a rich theoretical base to an important practical problem.

REFERENCES

Gately, D., 'Sharing the Gains from Regional Cooperation: A Game Theoretic Application to Planning Investment in Electric Power', *International Economic Review*, February 1974.

Hamlen, S., W. Hamlen, and J. Tschirhart, 'The Use of Core Theory in Evaluating Joint Cost Allocation Schemes', *The Accounting Review*, July 1977.

Loehman, E., J. Orlando, Jr., J. Tschirhart, and A. Whinston, 'Cost Allocation for a Regional Wastewater Treatment System', *Water Resources Research*, April 1979.

Luce, R., and H. Raiffa, *Games and Decisions*, John Wiley & Sons, 1957.

Moriarity, S. 'Another Approach to Allocating Joint Costs', *The Accounting Review*, October 1975.

Schmeidler, D., 'The Nucleolus of the Characteristic Function Game', *SIAM Journal of Applied Mathematics*, November 1969.

Segal, D., 'On Making Customs Unions Fair: An East African Example', *Yale Economic Essays*, 1970.

APPENDIX

Anderson, Brown and Carlyle are three farmers who use a certain type of livestock feed called Arpo-X. Each farmer's monthly usage of Arpo-X is constant and is shown below. Arpo-X is sold subject to quantity discounts. The more the farmer buys, the less it costs per pound. Each farmer's cost per pound is also shown below.

	Monthly usage of Arpo-X in pounds	Total cost	Cost per pound
A	100	$100	$1.00
B	200	$174	$ .87
C	300	$241	$ .8033
Total	600	$515	

Anderson, Brown and Carlyle have been thinking about pooling their purchases of Arpo-X to take further advantage of the quantity discounts. Here is how much it would cost to buy the total monthly usage of Arpo-X in one purchase:

	Monthly Usage of Arpo-X in pounds	Total cost	Cost per pound
A, B & C Combined	600	$419	$ .6983

The total saving by purchasing together instead of separately is $96, which is $515 minus $419. The farmers now have to decide how to split up the $96 savings. There is a danger that if one farmer doesn't feel that he's getting enough of the savings, he'll decide not to join with the other two in the purchasing.

Below is some other information about possible savings for the remaining two farmers if one farmer does decide not to cooperate.

Two farmers	Monthly usage of Arpo-X in pounds	Total cost	Cost per lb.	Savings for the two farmers	Extra savings if 3rd farmer joins in
A & B	300	$241	$.8033	$33	$63
A & C	400	$303	$.7575	$38	$58
B & C	500	$362	$.724	$53	$43

The problem is to divide up the $96 savings so that each farmer is satisfied.

After analyzing the information, complete the schedule below to divide up the $96 savings from the combined buying.

	Cost now	Share of saving	Cost now minus saving (Net cost)	Monthly usage	Net cost per pound
A	$100	$________	$______	100	$______
B	$174	$________	$______	200	$______
C	$241	$________	$______	300	$______
Total	$515	$ 96	$ 419	600	

Please make sure that the columns labelled 'Share of saving' and 'Cost now minus saving' sum-up to their respective totals. There are some additional questions to answer and more room for computations on the next page.

Computations:

Additional Questions:

1. What is your age? __________
2. In what year did you receive your bachelor's degree? __________
3. What was your undergraduate major? ______________________________
4. What is your primary job function? (check one):
   Accounting ________; Finance ________; Management ________; Sales ________;
   Full-time Student ________; Other (specify) ____________________
5. You were asked to divide up the savings realized from farmers cooperating with one another. Have you ever been involved in dividing up similar 'gains (savings) from cooperation' in connection with your job?
   Yes ________ No ________
6. Briefly explain how you divided up the $96 savings among the three farmers.

Computations:

ABACUS, Vol. 24, No. 2, 1988

DENIS J. PRATT

Capital Maintenance Adjustment Under the Financial (Real) Capital Concept

This paper examines the way in which the general purchasing concept of capital has been implemented in the real business income and selling price models. It presents an analysis of the conceptual aspects of the alternative methods of implementation proposed in the literature and identifies limitations in adjusting for inflation in entry price models.

Key words: Current value accounting; Inflation accounting; Purchasing power.

INTRODUCTION

A number of alternative systems based on contemporary prices were proposed in the time variously described as the 'golden age in the history of a priori research in accounting' (Nelson, 1973, p. 4) and the 'general normative theory period' (Henderson and Peirson, 1983, p. 47). In this extensive literature there was much debate about the merits of the information content and 'validity' of the financial magnitudes that result from particular models. One element of the debate was whether adjustment should be made for changes in the dimension of the measuring unit due to inflation, that is, changes in the general purchasing power of money or command over goods and services in general. Advocates of two of the major models—real business income and the selling price models—recommended such an adjustment, some by an item by item procedure, others by a simple capital maintenance adjustment. While there was intense debate about the relative merits of most aspects of the various models, the form of the adjustment was not the subject of much attention. The aim of this paper is to show why the form of the capital maintenance adjustment is also of concern. First, it is shown that, within a particular model, numerically the end result is the same from applying either procedure and no substantive justification has been offered for the item by item procedure. It is argued in this paper that a single adjustment should have been preferred not primarily because of simplicity but rather because it provides superior feedback about the components of the periodic income calculation. Second, a better understanding of the alternatives is facilitated by the analysis of the relationship of capital adjustment to the capital and asset valuation concepts of the alternative models. This suggests that the adjustment which is calculated in an entry price system is incommensurable with the notion of inflation as it is not purely a measure of purchasing power.

DENIS J. PRATT is a Senior Lecturer in Accounting at the University of Tasmania.

The author acknowledges the helpful comments of R. J. Chambers, S. A. Leech and P. W. Wolnizer.

THE MODELS AND THEIR CAPITAL CONCEPTS

One of the models proposed is the 'real profit' version of the current cost entry price model suggested, inter alia, by Edwards and Bell (1961) and subsequently used, in part, in the Financial Accounting Standards Board's (FASB) SFAS33. The other is the selling price model proposed, as Continuously Contemporary Accounting (CoCoA), by Chambers (the major exposition was Chambers, 1966) and separately by Sterling (initially in Sterling, 1970). In each of the latter the capital concept is a financial rather than a physical notion. This is the basis for their having a similar adjustment. In contrast the other major model, current cost accounting, is based on an operating capability capital concept.

Various explanations have been offered for using the general purchasing power of shareholders' funds as the capital concept. Two different arguments may be identified although some writers appear to have mixed the arguments which encompass quite different notions. One argument is a mathematical or metrical one:

> If at the end of the period the dimension of the monetary unit is different from its dimension at the beginning, the latter must be subjected to transformation to the dimension at the end before calculation in homogeneous terms is possible. (Chambers, 1966, pp. 115-16)

This measurement explanation was also alluded to by Sterling (1970, pp. 339-40). After concluding that 'The current market price is the only number that relates all the extant alternatives', he suggested that 'Any attempt to make the dollars intertemporally comparable must utilize the present as the base and inflate or deflate the previous valuations'. Consistent with Chambers, he stated that 'in the absence of any index, the units are clearly not comparable; they are not additive, and thus the difference in wealth is erroneous'. He recommended indexation using the consumer price index (CPI).

An alternative way of explaining this argument has been to use the notion of 'the dated dollar'. This was done by Chambers in explaining the adjustment to the nominal increment in net assets, based on selling prices, for the change in general purchasing power. He referred to the income calculation as producing 'the increment in general purchasing power during the year, expressed in dated dollars at the end of the year' (1980, p. 40). Edwards, Bell and Johnson (1979, pp. 541-51) also made frequent reference to the notion of 'the dated dollar' in explaining the case for general price level adjustments, which they recommended be applied to cost saving and capital gain figures within an entry price accounting system.

Although the three sources appear to use similar arguments to support use of a general price concept, Sterling and the Edwards and Bell papers also intermingled a different explanation—the motivations or spending behaviour of shareholders. Sterling wrote that 'In view of the motivation of the enterprise, it should be obvious that we think the Consumer Price Index is most appropriate' (1970, p. 340). Similarly the CPI was recommended by Edwards, Bell and Johnson on the grounds, *inter alia*, that 'One of the primary purposes of business firms is to generate spendable funds for the people who provided capital to the firms. For these people, the relevant index is one that indicates command over goods and services as consumers' (1979, p. 541).

This combination of explanations is idiosyncratic. The measurement explanation does not depend on the motivations or spending intentions of the providers of capital but is confined to accounting for the firm itself. It is sufficient reason for making the general price level adjustment. Income is not necessarily spent on consumer goods so the motivation and spending intentions argument ought not be used to support the use of the CPI. The CPI must be seen as providing an index of changes in the general purchasing power of money.

IMPLEMENTING THE GENERAL PURCHASING POWER ADJUSTMENT

The general purchasing power concept could be implemented in two ways—either by making adjustments for each item in a statement of financial position or by making a single transformation adjustment. There should not be any theoretical impediment to applying either of these methods to results for trading and valuation adjustments regardless of whether they arise from entry prices or exit prices. These alternatives are demonstrated for both cases using the simple example of a firm having the following financial position at t_0.

Shareholders funds	$40	Monetary assets	$20
Monetary liabilities	10	Non-monetary assets	30
	$50		$50

It is assumed that no transactions occur in the next accounting period, that prices in general increase by 10 per cent and that the valuation of the non-monetary assets is $40 at t_1.

Adjustment Under Entry Price Accounting

Adjusting for each item. This requires the calculation and reporting of separate amounts both for gains and losses on monetary items and for 'real' gains and losses on non-monetary items. In the latter calculation nominal gains and losses are adjusted ('deflated') by the measure of the change in the value of the money unit to give so-called real measures. Some writers, such as Edwards and Bell, refer to the amount of the adjustment as a 'fictional' element. For a nominal gain or cost saving (cs) on an asset and an increase in the general price level the relationship is

real gain/cs = nominal gain/cs − fictional gain/cs.

Using our example, this approach produces the income statement:

Real gain on non-monetary asset $40 − 110% (30)	$7
Gain on monetary liabilities 10% ($10)	1
Loss on monetary assets 10% ($20)	(2)
Income	$6

Disclosure of items of this type was required by SFAS33 issued in 1979. One of the specific disclosures required was the purchasing power gain/loss on net monetary items, the sum of the second and third item in the above statement; another was for the increases in current cost of specified assets 'net of inflation', as in the first item (the $7 gain).[1] In the statement above an amount is not specifically identified for the effect of the inflation adjustment. Rather, that amount is spread across a number of items in achieving an accounting for inflation.

The idea of making such adjustments for each balance sheet item is not new and was evident in Sweeney's presentation in the 1930s of 'stabilized accounting' based on replacement cost. His example involved adjusting a figure computed for 'unrealized appreciation' (replacement cost minus historic cost) for the effect of the general price change to obtain a '*net* gain of appreciation on fixed asset' (Sweeney, 1936, pp. 49-50, emphasis added).

Single adjustment. The same income result as that obtained above may be achieved by the use of a single inflation adjustment which is deducted from the sum of current operating profit and holding gains/cost savings calculated in what Edwards, Bell and Johnson call 'raw dollars'. In the example there is a holding gain for the non-monetary asset but there are no trading activities. Income may be calculated and reported as follows:

Holding gain – non-monetary asset	$10
Inflation adjustment	4
Income	$ 6

The accounting adjustment for inflation is separately and specifically identified. This is in contrast to the multiple adjustment system, as shown above, in which the inflation adjustment is not separately identified. While this adjustment appears technically possible it has not been suggested, or apparently considered, by the proponents of entry price accounting.

Adjustment Under Exit Price Accounting

With exit price accounting it is also technically possible to implement the adjustment for a change in the general purchasing power of money by either multiple adjustments or a single adjustment. Assume that the exit price valuation on the non-monetary assets at t_1 in the above example is $45 (given that exit price is likely to differ from entry price).

Adjusting for each item. Income may be calculated in similar fashion to that shown for entry price accounting:

---

[1] See SFAS33, paras 29 and 30.

(Real) Gain from holding non-monetary asset ($45 − 110% (30))	$12
Gain on monetary liabilities 10% ($10)	1
Loss on monetary assets 10% ($20)	(2)
Income	$11

Whilst these items appear analogous to those shown in the previous section it must be remembered that the valuation difference to which the adjustment is applied is a difference between exit prices at successive balance dates.

Single transformation adjustment. The alternative of making a single adjustment has been proposed for the CoCoA model in the form of a capital maintenance adjustment. The income statement would take the following form:

Price variation adjustment ($45 − $30)	$15
Capital maintenance adjustment 10% ($40)	4
Income	$11

The income figure again is invariant between the single transformation and the item by item approach. The illustration has been for a transactionless period. If transactions were included the income statement would show three elements—realized gains from trade from the transactions, unrealized price variations, and the effect of inflation as shown by the capital maintenance adjustment—instead of the last two elements in this simplified example.

There should not be any impediment to applying either of these methods to results for trading and valuation adjustments regardless of whether they arise from entry prices or exit prices.

SUPPORTERS OF THE ALTERNATIVES

The item by item approach to converting 'money' accounts into 'real' accounts was presented by Edwards and Bell (1961, p. 233). The complexity of such conversion was acknowledged but justified on the basis that 'the measurement of money profit alone does not provide information on exactly how well a decision-maker has done'.

Chambers has consistently recommended the use of a single transformation to implement the purchasing power notion of capital as explained in *Accounting, Evaluation and Economic Behavior* (1966, pp. 253-6). Chambers (1965, pp. 737-8) criticized the complicated adjustment process of the item by item approach and the assumptions which may be required for its application. He demonstrated the single transformation adjustment and argued that it was a preferable way of implementing the capital maintenance notion. In their subsequent writings neither Edwards nor Bell has given any attention to the possibility of using a single item capital maintenance adjustment or to why the item by item adjustment is preferable.[2] Other writers sympathetic to the 'Business Income' approach have also ignored the issue. For example, Whittington (1983, pp. 183-8) indicated a preference for what he calls 'real terms' accounting and presented an example showing current entry price accounts adjusted for the effect of a general price level change on an item by item basis.

Sterling also proposed the maintenance of general purchasing power and provided an illustration of its application on an item by item basis (Sterling, 1975). He subsequently described a single adjustment, in particular Chambers' capital maintenance adjustment, as 'a short-cut technique that yields identical results' (1979, p. 160).

The next section examines some of the expositions which use separate adjustments to see what arguments may be adduced to support that approach, compared with the separate and single identification of an inflation element.

ARGUMENTS IN THE LITERATURE

In the discussion of the item by item approach Edwards and Bell did not suggest specific uses or information content of separate 'real' items. The implication is that it is the aggregate 'real' figures which are significant; for example, it was stated that 'Measures of real profit are needed principally . . . to provide information on the real position of the firm and on the real increment, if any, in that position' (1961, p. 233). They acknowledged that 'the same deflators would apply to alternative courses of action as apply to the one adopted' (p. 264).

Edwards, Bell and Johnson presented similar arguments and the same procedure for adjustment. They stated that, because of general price level changes, dollars of different dates 'cannot be realistically compared with each other, nor can they be added to or subtracted from one another and produce a meaningful result'. Conceptually the adjustment process is described as relating 'an objective general price level index for each date associated with either a dollar input or dollar output' (1979, p. 541). As in *The Theory and Measurement of Business Income* (Edwards and Bell, 1961), this was demonstrated using assumptions about the dates to which items relate. This would necessarily have to be done in practice as it is not feasible to obtain an index for all event dates.

None of the proponents of expressing accounts in real terms based on entry prices made reference to the significance of the individual items in real terms. The only reference was to the utility of aggregate real terms figures. The one item produced in this process which has been implied as having information content is the gain or loss on monetary items, obtained when the general price index is applied to amounts fixed in money units.

Chambers has criticized the 'real' accounts for the assumptions and averaging which would have to be made in implementing the real business income model. He suggested that his system, which includes the use of a single transformation adjustment, 'holds closely to the principle of recording nothing that is not observable or calculable from observation'. In respect of the 'real' items Chambers wrote that 'the results are therefore unlikely to be readily interpretable by any person who is himself an observer' (1965, p. 740). The argument might be elaborated in the following manner. The managers of a business begin each accounting period with a particular endowment of net assets. They only have the capacity to produce nominal increments through the items owned and owed. Managers do not have control over the 'fictional' amount which could be computed for each item. Thus, we might expect that explicit reasons would be given to the effect that the information content in the real items is superior to that in the nominal items before concluding that the nominal figures should be omitted. It is the nominal figures which reflect the firm-specific events of a period and any straightforward notion of accountability requires that they be reported to communicate consequences of current period activities. Separate reporting of the total amount required for capital maintenance is sufficient real/fictional information given that the objective in both entry and exit price systems is to ensure that increments shown are 'real'. The purpose in both cases is to ensure that an appropriate benchmark is used for aggregate calculations.

---

[2] See, e.g., Bell, (1971, 1982), Edwards (1975) and Edwards, Bell and Johnson (1979).

ASSET VALUATION AND THE CAPITAL CONCEPTS

There appears to be a stand-off in the literature regarding the use of a single or multiple adjustment for changes in the general level of prices. It is not possible to isolate or deduce from the literature any arguments for adjustment to each item. This applies even for the entry price model where that approach frequently has been advocated. No reasons can be adduced for the complex adjustment procedure whether net assets are valued at entry or exit prices. An explanation which the proponents of the different models might have used for the different adjustment procedures may be discovered by examining the underlying capital concepts, and in particular the connection between inflation adjustments and capital concepts. That examination is undertaken next.

The simple illustrations in the first part of this paper concentrated on the comparison of an inflation adjustment made to opening capital, in the single adjustment case, and the multiple adjustment case in which an adjustment is made separately to each of the assets and liabilities. The measure of opening capital is a function of the asset valuation method of the particular model. Since those methods differ, the underlying capital concept is different. The following examination of the relationship between the concept of inflation as a change in general purchasing power of money and the capital concepts employed in different models provides some justification for the stand-off reported above. A single adjustment is shown to be conceptually consistent in the exit price model and conceptually unsatisfactory in the entry price model.

In expositions of the alternative current value accounting models it has become fashionable to classify the models according to the capital maintenance concept and the asset valuation method recommended for each. (See, e.g., Gynther, 1981, Appendix IV.) In these classifications the two models considered here are described as being based on a financial capital maintenance concept. However, when each asset valuation method and the inflation adjustment are considered together, the supposedly similar properties are seen to be different.

Edwards and Bell, Sweeney, Whittington and FAS33 advocate valuing assets at current cost (CC) or a valuation derived from the 'value to the owner' (VO). This usually results in a current replacement cost valuation for physical assets. That valuation is based on the amount of money *required* to replace an asset. It is not an indication of purchasing power available to the accounting entity from ownership of an asset. Therefore an aggregation which includes amounts determined in a current cost manner cannot be described as an indicator of purchasing power. Purchasing power is provided by money or the capacity of assets to be exchanged for money. Under CC and VO the purchasing power 'embodied' in the assets is *not* measured. To then multiply the replacement cost figure by a purchasing power factor, either singly or for separate components, cannot produce a measure indicative of available purchasing power. That is, restating the asset values using an index cannot produce a 'purchasing power adjustment' because the original 'raw' amount was not indicative of purchasing power (Clarke, 1976). Thus, in an entry price model the aggregate amount of 'inflation adjustment' under either an item by item approach or a single adjustment cannot yield a measure of purchasing power. It is a mixed measure combining current purchase prices and a purchasing power index. The result is meaningless—it has no empirical referent.

The asset measurement espoused by Chambers and by Sterling uses current exit prices. They argue that only current selling prices can provide a measure of general purchasing power (capacity to command goods and services). And only then are such measurements able to be compared with beginning of period capital, in general purchasing power terms, to ascertain income which is defined as a general purchasing power increment. Aggregations of exit prices indicate potential purchasing power at a particular date. Applying an index of change in general purchasing power to such an aggregation at t_0 converts it to equivalent general purchasing power at t_1 and enables the calculation of the change in purchasing power which is a measure of income. The capital notion is of dated general purchasing power.

The single capital maintenance adjustment in CoCoA, as shown above is a purchasing power measure. It gives an indication of one component of business risk—the amount of increase in net assets required to maintain the opening stock of purchasing power. It is separated from the two other indicators of business performance which appear in a CoCoA income statement—the realized gains/losses from trading and unrealized gains/losses from holding. Sterling's preparedness to accept the item by item approach means that two of these measures are mixed together—an unhelpful complication.

The argument above has demonstrated the logical consistency of the CoCoA model in the sense that the capital and asset measurements are conceptually consistent and the income statement items are logically interpretable. By way of contrast, in the real business income model (where the asset valuation method is at odds with a purchasing power adjustment) the asset aggregations and income measures are not interpretable.

However, a pure CCA model uses a capital concept which is not based on the purchasing power of money but rather on the operating capability of the entity. Combining that concept with entry price asset valuations does not involve a conceptual inconsistency in the way that the real business income model does because neither operating capability nor entry prices are concerned with the determination of, or adjustment for general purchasing power.[3]

CONCLUSION

The financial capital maintenance concept as identified in various accounting models involves adjustment for the change in the general purchasing power of money. This has been implemented by some authors on an item by item basis, by others through a single adjustment. An information content argument in support of the item by item approach showing real increments is noticeably absent from the literature. Conversely, the identification in CoCoA of the aggregate elements affecting operations, including a single capital maintenance adjustment, is consistent with the identification of different types of business risk. A possible reason for the lack of explanations for the real business income approach is to be found in the incommensurability of the asset and capital concepts used – the mixing of a cost based measure with a general purchasing power adjustment. In contrast, in the exit price model both the capital and asset valuation concepts are based on the notion of general purchasing power.

REFERENCES

Bell, P. W., 'On Current Replacement Costs and Business Income', in Robert R. Sterling (ed.), *Asset Valuation and Income Determination*, Scholars Book Co., 1971.

———, *CVA, CCA and CoCoA: How Fundamental are the Differences?* Accounting Theory Monograph No. 1, Australian Accounting Research Foundation, 1982.

Chambers, R. J., 'Edwards and Bell on Business Income', *The Accounting Review*, October 1965.

———, *Accounting, Evaluation and Economic Behavior*, Prentice-Hall, 1966.

———, *Price Variation and Inflation Accounting*, McGraw-Hill, 1980.

———, 'Edwards and Bell on Income Measurement in Retrospect', *Abacus*, June 1982.

Clarke, F. L. 'CCA/CPP: A Technical Impossibility', *The Accountant's Magazine*, October 1976.

Edwards, E. O., 'The State of Current Value Accounting', *The Accounting Review*, April 1975.

Edwards, E. O., and P. W. Bell, *The Theory and Measurement of Business Income*, University of California Press, 1961.

Edwards, E. O., P. W. Bell, and L. T. Johnson, *Accounting for Economic Events*, Scholars Book Co., 1979.

Financial Accounting Standards Board, *Statement of Financial Accounting Standards No. 33 Financial Reporting and Changing Prices*, September 1979.

Gynther, R. S., 'Why Use General Purchasing Power?', *Accounting and Business Research*, Spring 1974.

———, 'Capital Maintenance, Price Changes and Profit Determination', as reprinted in R. Bloom and P. T. Elgar (eds), *Accounting Theory and Policy: A Reader*, Harcourt Brace Jovanovich, 1981.

Henderson, S., and G. Peirson, *Financial Accounting Theory: Its Nature and Development*, Longman Cheshire, 1983.

Nelson, C. L., 'A Priori Research in Accounting', in N. Dopuch and L. Revsine (eds), *Accounting Research 1960-1970: A Critical Evaluation*, Monograph 7, Center for International Education and Research in Accounting, University of Illinois, 1973.

Sterling, R. R., *Theory of the Measurement of Enterprise Income*, Kansas University Press, 1970.

———, *Toward a Science of Accounting*, Scholars Book Co., 1979.

———, 'Relevant Financial Reporting in an Age of Price Changes', *Journal of Accountancy*, February 1975.

Sweeney, H. W., *Stabilized Accounting*, Harper & Brothers, 1936.

Whittington, G., *Inflation Accounting: An Introduction to the Debate*, Cambridge University Press, 1983.

[3] See Gynther (1974) for extensive argument against the use of general purchasing power in accounting and financial reporting.

INDEX TO VOLUMES 21 to 24

Ashton, R. K. *Re-appraisal of Garner* v. *Murray: A Reply* Vol. 22, p. 51

Ashton, R. K. *The Royal Mail Case: A Legal Analysis* Vol. 22, p. 3

Ashton, R. K. *Value to the Owner: A Review and Critique* Vol. 23, p. 1

Baladouni, Vahe *East India Company's 1783 Balance of Accounts* Vol. 22, p. 59

Barlev, Benzion (with Peles) *Accounting: The Structure of a Growing Profession* Vol. 23, p. 70

Barton, Thomas L. *Intuitive Choice of Cooperative Sharing Mechanisms for Joint Cost Savings: Some Empirical Results* Vol. 24, p. 162

Bazley, M. (with Brown and Izan) *An Analysis of Lease Disclosures by Australian Companies* Vol. 21, p. 44

Bell, Philip W. *Boussard's 'Effectiveness of Inflation Accounting Adjustments': A Comment* Vol. 23, p. 91

Bricker, Robert J. *Knowledge Preservation in Accounting: A Citational Study* Vol. 24, p. 120

Brown, P. (with Bazley and Izan) *An Analysis of Lease Disclosures by Australian Companies* Vol. 21, p. 44

Burrows, G. H. *Evolution of a Lease Solution* Vol. 24, p. 107

Callen, Jeffrey L. *A Medieval Controversy About Profit and Loss Allocations* Vol. 23, p. 85

Chambers, R. J. *Accounting Education for the Twenty-first Century* Vol. 23, p. 97

Chhatwal, Gurprit S. (with Mensah) *Accounting for Shrinkage in Continuous Flow Industries: An Expository Note* Vol. 23, p. 31

Chong, Sebastian (with Dean) *Related Party Transactions: A Preliminary Evaluation of SFAS 57 and IAS 24 Using Four Case Studies* Vol. 21, p. 84

Clarke, F. L. (with Dean) *Schmidt's* Betriebswirtschaft *Theory* Vol. 22, p. 65

Craig, Russell (with Tippett) *Estimating Current Cost Depreciation Expense Using Numerical Analysis and the STAPOL Technique: A Pedagogic Exposition* Vol. 23, p. 141

Craswell, A. T. *An Examination of Alternative Hypotheses Concerning Depreciation of Buildings* Vol. 22, p. 29

Cron, W. R. (with Hayes) *Changes in Task Uncertainty Induced by Zero-Base Budgeting: Using the Thompson and Hirst Models to Predict Dysfunctional Behaviour* Vol. 24, p. 145.

Dean, Graeme (with Chong) *Related Party Transactions: A Preliminary Evaluation of SFAS 57 and IAS 24 Using Four Case Studies* Vol. 21, p. 84

Dean, Graeme (with Clarke) *Schmidt's* Betriebswirtschaft *Theory* Vol. 22, p. 65

Dunlop, Anna *Bibliographical Notes on Five Examples of Pacioli's* Summa *(1494)* Vol. 21, p. 149

Edwards, John Richard *The Origins and Evolution of the Double Account System: An Example of Accounting Innovation* Vol. 21, p. 19

Enis, Charles R. (with Morash) *Accounting for Public Policy Actions: The Case of Motor Carrier Deregulation* Vol. 21, p. 63

Findlay, M. C. (with E. E. Williams) *Toward a Positive Theory of Corporate Financial Policy* Vol. 23, p. 107

Fraser, Ian A. M. *Deprival Value or Value to the Owner?—A Clarification* Vol. 24, p. 86

Gaffikin, M. J. R. *Legacy of the Golden Age: Recent Developments in the Methodology of Accounting* Vol. 24, p. 16

Gaffikin, M. J. R. *The Methodology of Early Accounting Theorists* Vol. 23, p. 17

Gray, S. J. *Towards a Theory of Cultural Influence on the Development of Accounting Systems Internationally* Vol. 24, p. 1

Grinyer, John R. *Earned Economic Income—A Theory for Matching* Vol. 21, p. 130

Grinyer, John R. *A New Approach to Depreciation* Vol. 23, p. 43

Gul, Ferdinand A. *The Effects of Uncertainty Reporting on Lending Officers' Perceptions of Risk and Additional Information Required* Vol. 23, p. 172

Gwilliam, D. R. *Apportionment in Actions Against Auditors* Vol. 24, p. 37

Henning, G. R. (with Marsh) *Some History of the Debate on Educational Policy of Accountants in Australia* Vol. 23, p. 55

Hayes, Randall B. (with Cron) *Changes in Task Uncertainty Induced by Zero-Base Budgeting: Using the Thompson and Hirst Models to Predict Dysfunctional Behaviour* Vol. 24, p. 145

Hopkins, Roger (with Ma) *Goodwill—An Example of Puzzle-Solving in Accounting* Vol. 24, p. 75

Houghton, K. A. *Re-appraisal of Garner* v. *Murray: A Comment* Vol. 22, p. 47

Hutchinson, Patrick J. (with Reeve) *The Contribution of Non-U.S. Institutions to Academic Accounting Journals* Vol. 24, p. 90

Izan, H. Y. (with Bazley and Brown) *An Analysis of Lease Disclosures by Australian Companies* Vol. 21, p. 44

Lall Nigam, B. M. *Bahi-Khata: The Pre-Pacioli Indian Double-entry System of Bookkeeping* Vol. 22, p. 148

Lapsley, Irvine *Risk Capital for a Profitable Public Corporation: Public Dividend Capital or Equity* Vol. 21, p. 3

Ma, Ronald (with Hopkins) *Goodwill—An Example of Puzzle-Solving in Accounting* Vol. 24, p. 75

Madan, Dilip B. *Project Evaluation and Accounting Income Forecasts* Vol. 21, p. 197

McKinnon, Jill (with Partington and Martin) *Funds Statements and the Two-Entity Test: A Response* Vol. 22, p. 39

Marsh, J. A. (with Henning) *Some History of the Debate on Educational Policy of Accountants in Australia* Vol. 23, p. 55

Martin, Carrick (with Partington and McKinnon) *Funds Statements and the Two-Entity Test: A Response* Vol. 22, p. 39

Mensah, Yaw M. (with Chhatwal) *Accounting for Shrinkage in Continuous Flow Industries: An Expository Note* Vol. 23, p. 31

Mepham, M. J. *The Eighteenth-Century Origins of Cost Accounting* Vol. 24, p. 55

Morash, Edward A. (with Enis) *Accounting for Public Policy Actions: The Case of Motor Carrier Deregulation* Vol. 21, p. 63

Nobes, Christopher W. *The Pre-Pacioli Indian Double-entry System of Bookkeeping: A Comment* Vol. 23, p. 182

Parker, Lee D. *An Historical Analysis of Ethical Pronouncements and Debate in the Austrlain Accounting Profession* Vol. 23, p. 122

Partington, Graham (with McKinnon and Martin) *Funds Statements and the Two-Entity Test: A Response* Vol. 22, p. 39

Peasnell, K. V. (with D. J. Williams) *Ersatz Academics and Scholar-saints: The Supply of Financial Accounting Research* Vol. 22, p. 121

Peles, Yoram C. (with Barlev) *Accounting: The Structure of a Growing Profession* Vol. 23, p. 70

Pratt, Denis J. *Capital Maintenance Adjustment Under the Financial (Real) Capital Concept* Vol. 24, p. 170

Reeve, Robert C. (with Hutchinson) *The Contribution of Non-U.S. Institutions to Academic Accounting Journals*, Vol. 24, p. 90

Robb, Alan J. *Funds Statements and the Two-Entity Test* Vol. 21, p. 101

Robb, Alan J. *Funds Statements and the Two-Entity Test: A Reply* Vol. 22, p. 45

Stark, A. W. *More on the Discounting of Residual Income Streams* Vol. 22, p. 20

Stokes, Donald J. (with Sullivan) *Auditors' Responsibilities for Events Arising After Balance Date* Vol. 24, p. 132

Subotnik, Dan *Wisdom or Widgets: Whither the School of 'Business'?* Vol. 24, p. 95

Sullivan, Graham *Accounting and Legal Implications of the Interposed Unit Trust Instrument* Vol. 21, p. 174

Sullivan, Graham G. (with Stokes) *Auditors' Responsibilities for Events Arising After Balance Date* Vol. 24, p. 132.

Taylor, Stephen L. *International Accounting Standards: An Alternative Rationale* Vol. 23, p. 157

Tippett, Mark (with Craig) *Estimating Current Cost Depreciation Expense Using Numerical Analysis and the STAPOL Technique: A Pedagogic Exposition* Vol. 23, p. 141

Trotman, Ken T. (with Zimmer) *Revenue Recognition in the Construction Industry: An Experimental Study* Vol. 22, p. 136

Vickrey, Don W. *Normative Information Qualities: A Contrast Between Information-Economics and FASB Perspectives* Vol. 21, p. 115

Whittred, Greg *The Evolution of Consolidated Financial Reporting in Australia* Vol. 22, p. 103

Williams, D. J. (with Peasnell) *Ersatz Academics and Scholar-saints: The Supply of Financial Accounting Research* Vol. 22, p. 121

Williams, E. E. (with Findlay) *Toward a Positive Theory of Corporate Financial Policy* Vol. 23, p. 107

Young, S. David *Financial Reporting and the Austrian Theory of Entrepreneurship* Vol. 23, p. 10

Zimmer, Ian R. (with Trotman) *Revenue Recognition in the Construction Industry: An Experimental Study* Vol. 22, p. 136

CONTEMPORARY ACCOUNTING RESEARCH / RECHERCHE COMPTABLE CONTEMPORAINE

Vol 4/No 2/Spring/printemps 1988

Contents

Articles

Good Judgment in Public Accounting: Quality and Justification ... C. Emby and M. Gibbins 287
On Sample Size Allocation in Auditing .... U. Menzefricke and W. Smieliauskas 314
A Hierarchical Approach to the External Auditor's Evaluation of the Internal Auditing Function .... W. F. Messier, Jr. and A. Schneider 337
Economic Effects of a Mandated Audit in a Contingent-Claims Production Economy .... W. R. Scott 354
Discussion of "Economic Effects of a Mandated Audit in a Contingent-Claims Production Economy" .... M. Penno 389
An Experimental Study of the Effects of Elicitation Methods on Review of Preliminary Audit Strategy by External Auditors .... J. E. Boritz, B. G. Gaber and W. M. Lemon 392
Discussion of "An Experimental Study of the Effects of Elicitation Methods on Review of Preliminary Audit Strategy by External Auditors" .... M. Gibbins 412
Attestation Research Opportunities: 1987 .... W. R. Kinney, Jr. 416
L'attestation: avenues de recherche, 1987 .... W. R. Kinney, Jr. 426
Firm Size and the Information Content of Annual Earnings Announcements ...... B. T. Ro 438
On Interim Information and the Information Content of Firm Earnings: A State Variable Approach .... A. Dontoh and G. Richardson 450
Discussion of "On Interim Information and the Information Content of Firm Earnings: A State Variable Approach" .... D. B. Thornton 470
A Comparative Examination of the Time-Series Properties and Predictive Ability of Annual Historical Cost and General Price Level Adjusted Earnings .... J. C. McKeown and H. Shalchi 485
Discussion of "A Comparative Examination of the Time-Series Properties and Predictive Ability of Annual Historical Cost and General Price Level Adjusted Earnings" .... W. R. Landsman 508
Discussion of "A Comparative Examination of the Time-Series Properties and Predictive Ability of Annual Historical Cost and General Price Level Adjusted Earnings" .... J. A. Ohlson 513
Implementable Equilibria in Accounting Contexts: An Exploratory Study .... A. H. Amershi and P. Cheng 515
Discussion of "Implementable Equilibria in Accounting Contexts: An Exploratory Study" .... R. A. Dye 564
An Empirical Analysis of the Expenditure Budget in Research and Development .... H. O. Rockness and M. D. Shields 568
Discussion of "An Empirical Analysis of the Expenditure Budget in Research and Development" .... J. G. Birnberg 582
Discussion of "An Empirical Analysis of the Expenditure Budget in Research and Development" .... J. H. Waterhouse 588
The effect of Unfunded Accumulated and Projected Pension Obligations on Governmental Borrowing Costs .... B. R. Marks and K. K. Raman 595
Comment on "Distinguishing the Two Forms of the Constant Percentage Learning Curve Model" .... A. W. Richardson 609
Distinguishing the Two Forms of the Constant Percentage Learning Curve Model: A Reply .... J. T. Chen and R. P. Manes 615

Book Reviews/Compte rendu de livres

P. W. Bell, *Current Cost/Constant Dollar Accounting and Its Uses in the Managerial Decision Making Process* .... R. Thakkar 617
L. D. Brown, *The Modern Theory of Financial Reporting* .... R. V. Mattessich 620
J. E. Butterworth and H. Falk, *Financial Reporting—Theory and Application to the Oil and Gas Industry in Canada* .... A. A. Atkinson 630
V. Salyzyn. *Canadian Income Tax Policy: An Economic Evaluation* .... H. A. Kennedy 638
Manuscripts Accepted for Future Publication ....
Book Review Scheduled for Future Publication ....
AD HOC Reviewers 1987/1988 ....

ACCOUNTING AND BUSINESS RESEARCH

A research quarterly published by the Institute of Chartered Accountants in England and Wales

Editors: R. H. Parker, University of Exeter
C. W. Nobes, University of Reading

Number 71 **Summer 1988**

CONTENTS

The Role of the Budget in Medium and Large UK Companies and the Relationship with Budget Pressure and Participation — *Stephen R. Lyne*

An Analysis of the Content of Corporate Submissions on Proposed Accounting Standards in the UK — *John B. MacArthur*

The Evaluation of Performance in Firms of Chartered Accountants — *Peter Moizer*, *Jamie Pratt*

Alternative Realities and Price Parity Translation — *Dennis H. Patz*

The Role of Accounting Information in Valuing Unlisted Shares — *Richard Pike*, *John Sharp*, *Jeffrey Kantor*

Product Pricing Behaviour Under Different Costing Systems — *Dennis P. Tishlias*, *Peter Chalos*

Book Reviews

Subscriptions should be sent to 40 Bernard Street, London WC1N 1LD, England.
Subscription rates are:

	U.K.	Overseas	Overseas Airmail
Individual	£22	£24	£29
Student	£11	£12	£17
Corporate/institutional	£32	£33	£38

All subscriptions can be paid in U.S. dollars at current rates of exchange.

Journal of Business Finance & Accounting

Winter 1988 Editor: Richard Briston Vol. 15 No. 4

Contents

Stock Returns and Expected Inflation in the UK: Some New Evidence
by D. A. Peel and P. F. Pope

Financial Analysis Among Large US Corporations: Recent Trends and the Impact of the Personal Computer
by Alan K. Reichert, James S. Moore and Ezra Byler

Loan Loss Reserves and Income Smoothing: The Experience in the US Banking Industry
by Christopher K. Ma

Forecasting Commercial Paper Rates
by Conway Lackman

Firm Dividend Policy and Insider Activity: Some Empirical Results
by Henry R. Oppenheimer and Terry E. Dielman

Optimal Acquisition Fraction and a Theory for Partial Acquisitions
by Asim Roy
Estimation of Periodic Standard Deviations Under the PERT and Derivation of probabilistic Information
by Sang-Hoon Kim and Hussein H. Elsaid

Moment Orderings and Stochastic Dominance Tests
by William H. Jean and Billy P. Helms

Interest, Morality, Orthodoxy, Gambling and Karim
by Roger J. Lister

Subscriptions:

	1989 Volume UK only	Overseas sterling	North America and Japan
Institutions, libraries and professional	£63.00	£72.50	$125.00
Teachers or students	£30.00	£35.00	$ 60.00
Journal of Business Finance & Accounting and *Financial Accountability & Management* (combined rate)			
Institutions, libraries and professional	£74.50	£87.00	$149.50
Teachers or students	£34.25	£40.50	$ 69.50

Order from Journals Dept., Basil Blackwell Ltd, 108 Cowley Road, Oxford, OX4 1JF, U.K.
Editorial communications to *JBFA/IMRAD*, University of Warwick, Coventry CV4 7AL, U.K.

THE ACCOUNTING HISTORIANS JOURNAL

Semiannual Publication of
The Academy of Accounting Historians
Volume 15, Number I Spring 1988

CONTENTS

Legal Acceptance of Accounting Principles in Great Britain and the United States
—Jean Margo Reid 1

The Nature and Function of Cost Keeping in a Late Nineteenth Century Small Business
—Thomas Tyson 29

Trends in the Evolution of Scholarly Accounting Thought: A Quantative Examination
—Miklos Vasarhelyi, Da Hsein Bao and Joel Berk 45

The Evolution of the Unitary Tax Apportionment Method
—Nancy Foran and Dahli Gray 65

The Rise of the Price of Wheat in the "Bakery in the Street of the Fishmarket" in the City of Lima: 1812-1821
—John T. S. Melzer 89

Features

A. A. Fitzgerald's "Accounting Principles—1938"
—with a Foreword by Louis Goldberg 119

Reviews

Review Essay: Reflections on a Renaissance Scholar: Carl Devine's *Essays in Accounting Theory*, Volumes I-V
—Edward Arrington 135

Book Reviews

Hall, *Accounting and Auditing: Thoughts on Forty Years in Practice and Education*
—R. J. Kirsch 141

Johnson, *A New Approach to Management Accounting*
—J. R. Razek 143

Shaplen, *Krueger: Genius and Swindler*
—D. L. Flesher 145

Doctoral Research 147

Contents of Research Journals 151

Listing of Consulting Referees .... Back Inside Cover

Financial Accountability & Management

Winter 1988 Editor: John Perrin Vol. 4 No. 4

Contents

Monitoring and Auditing Value for Money in the UK: The Scope for Quantitative Analysis
by Paul Anand

Current Issues in External Accounting of Public Authorities and Publi Enterprises in West-Germany
by Karl Oettle

Investment Appraisal in the National Health Service
by Kenneth Ferguson and Irvine Lapsley

An Examination of Public Retirement Systems Utilizing a Trans-Log Function Form
by Ralph H. A. Pope

Subscriptions:

	1989 Volume		
	UK only	Overseas sterling	North America and Japan
Institutions, libraries and professional	£35.00	£43.00	$74.00
Teachers or students	£15.00	£18.00	$31.00

Journal of Business Finance & Accounting and *Financial Accountability & Management* (combined rate)

Institutions, libraries and professional	£74.50	£87.00	$149.50
Teachers or students	£34.25	£40.50	$ 69.50

Order from Journals Dept., Basil Blackwell Ltd, 108 Cowley Road, Oxford, OX4 1JF, U.K.
Editorial communications to *Financial Accountability and Management*, Department of Economics, University of Exeter, Amory Building, Rennes Drive, Exeter EX4 4RJ, England.